

# **Socioeconomic change and the meaning of settlement in the Early Iron Age of Crete, 12th - 7th centuries BC**

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**VOLUME I**

**TEXT**



## Abstract

A settlement shift occurred in Crete during the 12th century BC (Late Minoan IIIC) from valleys and coasts to more elevated, usually defensible, sites in foothill and mountain zones. The study's aim is to place this phenomenon in the context of socioeconomic change known to have occurred in the Aegean/east Mediterranean in the 12th-7th centuries BC (Early Iron Age: EIA).

The implications of the settlement shift for subsistence (sometimes argued to have been its prime mover) are addressed through hinterland characterisation at six sites/site clusters in various regions of Crete. All have occupation starting in this period, but contrast greatly in their size, local topography and length of use. The approach makes use of long-term land-use and settlement history, ethnography, and soil studies, alongside archaeological data for the period (which now includes some archaeobotanical/faunal studies). On their own, none of these data sources can define EIA subsistence regimes. Considered together in the six different cases, they do allow significant conclusions to be drawn about the most likely practices and about the general degree of change between Late Bronze Age and Early Iron Age subsistence. In the second half of the thesis an analysis is made of sociopolitical/economic relationships within and between the new communities, and how these changed over the course of the EIA. They are discussed in the context of wider Aegean developments in exchange economy and in social organisation, strongly connected to new systems of production, circulation and consumption of high-value goods.

Many settlements founded in the shift of the 12th century were abandoned, while significant nucleation took place at others, from the Protogeometric period (early 10th century). The latter continued to develop through Archaic (7th and 6th centuries BC) and in many cases became Classical *poleis*. Their locations can be shown to share better access to large arable hinterlands and to communication routes than the abandoned sites, again giving rise to questions of how EIA settlement related to economic considerations. This settlement phase spans a period during which the foundations of state society emerged, and is analysed here from this perspective. The study concludes that settlement was a dynamic cultural practice, strongly affecting the rate and nature of sociopolitical and economic change, throughout the EIA. In particular, new collective identity structures associated with the rise of the *polis* can be shown to have been deeply integrated with changes in settlement as early as the 10th century BC. Other forms of social institutionalisation seem to have existed in Crete by the same time, and these elements together seem to have conditioned from early on a highly-distinctive trajectory of state development.

## Acknowledgements

This work owes a great deal to the original field research carried out by Krzysztof Nowicki on the topography of Early Iron Age settlement in Crete. It attempts to research the socioeconomic context of settlement pattern in this period and as such is intended to complement his work. I had access during the preparation of the thesis to the unpublished manuscript of his recent book (Nowicki 2000). Consultation and discussion with other scholars working on a variety of aspects of the Early Iron Age in Crete has also greatly informed the study. In particular, Donald Haggis, Barbara Hayden, Leslie Day, Peggy Mook, James Whitley and Metaxia Tsipopoulou have all been helpful. Irene Lemos provided me with unwavering emotional and intellectual support and helped me very much in obtaining grants to finance the study. I would like to thank Metaxia Tsipopoulou for allowing me to work on her excavation and study seasons under very free conditions, where I was allowed to divide my time between work at the two very different sites of Monasitraki Katalimata and Chalasmeno. In the course of the fieldwork I benefited from the knowledge of many local people, in particular Xaralambos Mandelenakis (Gonies), 'Barba' Yiannis (Vrachasi), Despina from Ayia Pelagia, Manolis and Giorgos Vardas and Manolis Klontzas from Kritsa, Spiros and Giorgos Kokoloyiannis at Profitis Elias.

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Jan Driessen helped me by allowing me to use his house as a base during my work on Anavlochos. Clio Zervakis and Carl Knappett also offered accommodation in Iraklion. Ken and Diana Wardle's hospitality in Birmingham helped greatly in combining marriage, PhD and job. My husband, parents, brother, and friends are owed thanks for providing many different kinds of support in the production of the thesis.

**Declaration:**

I confirm that this thesis is entirely of my own composition and represents my own original research.

Signed:

Saro Wallace  
August 2001

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## Notes on textual formatting, abbreviations and chronological references used in the text

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Greek words, including toponyms, are transliterated consistently throughout the text. The system followed is that used in the journal *Archaeological Reports*, with the following exceptions: β is transliterated here as v, φ as f.

Compass directions are written in full, except in the presentation of fieldwork data in Chapter 2.2, where they are abbreviated to improve text flow.

The reference style is Harvard throughout. Occasionally (in Chapters 3.1 and 4.1 particularly), long sets of references to sites mentioned in the text are put into footnotes rather than into the main text, for easy reading.

The ceramic chronology used for the Early Iron Age (EIA) is discussed in Chapter 1.2. The usual Neolithic-Bronze Age chronology for Crete is shown below (in two versions for the LMIA-IIIB period). The abbreviation BA for Bronze Age is used throughout.

Period	Bibliographic source for prehistoric dates	Approximate date
Neolithic	Warren and Hankey 1989: 169/Myers et al 1992: 23-4	c. 7000-3650/3500 BC
Early Minoan (EM) I	Warren and Hankey	c. 3500-2900 BC
EM II	Warren and Hankey/Myers et al	c. 2900-2300/2150 BC
EM III	Warren and Hankey/Myers et al	c. 2300/2150-2160/2025 BC
Middle Minoan MM IA	Warren and Hankey/Myers et al	c. 2160/2025-1900 BC
MM IB	Warren and Hankey	c. 1900-1850 BC
MM II	Warren and Hankey	c. 1850-1700 BC

MM IIIA	Betancourt 1987: 47 <i>or</i> Warren and Hankey/Myers et al	c. 1700/1650-1640/1630 BC
MM IIIB	Betancourt/Warren and Hankey/Myers et al	c. 1640/1630-1600 BC
Late Minoan LM IA	Betancourt/Warren and Hankey/Myers et al	17th-early 16th cent/c. 1600-1500 BC
LM IB	Betancourt/Warren and Hankey/Myers et al	c. 1590-1550/1500-1450 BC
LM II	Betancourt/Warren and Hankey/Myers et al	c. 1550-1490/1450-1400 BC
LM IIIA:1	Betancourt/Warren and Hankey/Myers et al	c. 1490-1430/1400-1370 BC
LM IIIA:2	Betancourt/Warren and Hankey/Myers et al	c. 1430-1365/1370-1320/ 1300 BC
LM IIIB	Betancourt/Warren and Hankey/Myers et al	c. 1365-1200/1320-1200/ 1190 BC
LM IIIC-Classical		See Chapter 1.2
Classical (C)		c.500-323 BC
Hellenistic (H)		323-67 BC
Roman (R)		67 BC-330 AD
Early Byzantine (EByz)		330-824 AD
Arab		824-961 AD
Late Byzantine (LByz)		961-1204 AD
Genoese		1204-1208 AD
Venetian (V)		1208-1669 AD
Turkish (T)		1669-1898 AD
Post-Turkish 'traditional' as used here; see Chapter 1.5)		1898-1950 AD

## Part 1

### Introduction

#### Chapter 1.1

#### Aims, concepts and approaches

##### *Background*

The following set of developments are indicated by archaeological and textual evidence to have characterised the Aegean and East Mediterranean from c.1200 BC (see, for example, Liverani 1987; Ward and Joukowsky 1992; Sherratt and Sherratt 1993; Mazarakis-Ainian 1997; Gitin et al 1998; Karageorghis and Morris forthcoming; Morris 2000).

1. The widespread destruction or abandonment of large nucleated settlements operating as political and economic centres within state organisations.
2. Related disturbance or collapse in complex economic structures based on long-distance import and export systems, where raw materials circulated against manufactured products in large quantities.
3. Movement and resettlement of population within, and probably between, regions.
4. Radical shifts in regional sociopolitical trajectories, and in interregional economic and political relations, through the Early Iron Age (EIA: here the 12th to 7th centuries BC).<sup>1</sup> These culminated in the emergence of a new (regionally variant) type of state form, the *polis*, in the Aegean by the 8th century.

A phenomenon occurs in Crete from c. 1200 BC which is widespread within the island. It is not paralleled to such an extent elsewhere, but there are good indications of a similar phenomenon in the Cyclades and in Cyprus (Hayden 1988: 19-21; Karageorghis 1998, 1990b; Nowicki 2000; Karageorghis and Morris forthcoming). This is a movement to naturally-defensible or artificially-fortified sites, entailing desertion or only very limited continuing occupation of the pre-existing (Late Minoan IIIA-B) settlements. It represents a fundamental change in long-term priorities for settlement location. The main aim of the present study lies in

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<sup>1</sup> See the next chapter for chronology. Haggis includes the whole period to 1200-500 BC in the EIA in Crete (Haggis 1993). Later I shall show how settlement encourages us to treat the whole period between PG and A as a single chronological unit, but various cultural changes which start to occur by the end of the 7th century made me unwilling to extend the study's remit beyond this date. These include the appearance of texts which mark the full emergence of the *polis* in Crete by c. 630 BC. Settlement pattern, too, starts to undergo complex changes somewhere within the A period.

assessing the relationship of this phenomenon, in the context of wider conditions just discussed above, to sociopolitical and economic developments in Crete prior to the emergence of the state. As I shall show, my approach is broadly in the *Annaliste* tradition (as it has been adopted for archaeology: see Bintliff, ed., 1991; Knapp, ed., 1992).

### *Reasons to study settlement in EIA Crete*

The lack of settlement evidence for the EIA, mentioned by Desborough as limiting the potential for understanding of life at this period, has now been greatly supplemented (Desborough 1964: 191). When Desborough wrote, about twenty settlements were known to be of EIA date: five of defensible type had been excavated. In the last twenty years, four more defensible sites have been excavated and two re-excavated, while several important sites of non-defensible type have been re-excavated or studied in more detail. A large amount of relevant survey data has been gathered (e.g. Hayden et al 1992; Watrous et al 1993; Watrous forthcoming a, b; Haggis 1992, 1996; Moody et al 1998a, 1998b; forthcoming). We now have information on the location, date and approximate size of more than 120 defensible settlements first used in LM IIIC and occupied for various spans within the EIA. This data, while it has been examined in its local context by the surveyors/excavators concerned, and collated by Nowicki with the results of his non-intensive, island-wide field research (Nowicki 2000),<sup>2</sup> still remains somewhat formalised in its treatment: relatively few attempts have been made to address its full context and meaning. Significant changes in Cretan EIA settlement are not restricted to the period around 1200 BC (Nowicki 2000: 241-7). From the PG period (the first half of the 10th century BC) there is a second widespread development: the abandonment of many LM IIIC settlements (usually the most highly defensible ones) while others saw a considerable degree of growth. These lasted into the Archaic period and often became the locations of Classical *poleis*. Settlement suggests that other aspects of sociocultural development in EIA Crete could also be seen as a self-referential continuum beginning c. 1200 BC. However, in order to use the settlement data in explanation, it must first be adequately theorised.

The general attractiveness of subsistence-related explanations for Aegean settlement location is noted by Bintliff:

‘We are justified from empirical evidence in stressing the importance of self-sufficiency in past settlement location. Till recently such an emphasis typified traditional Greek rural settlement. If economic viability is so important, clearly we would *expect* to find that little deviation is practised from site location within easy access to abundant food resources. Such a view assumes...that every unit of settlement, from the lowest farmstead to the greatest palace, was

<sup>2</sup> Targeted specifically at recovering evidence for defensible sites.

placed with an eye to its own subsistence base, and that trading, defence, communications were an inadequate basis for settlement. The considerable number of sites investigated by the writer gives 100% justification for these beliefs.’ (Bintliff 1977a: 114).

Studies of Bronze Age Crete have sometimes assumed the priority of subsistence/economic factors in determining settlement location in a way open to question. For example, in the area of Viannos, Banou and Rethemiotakis suggest that an LM II settlement relocation related to a change of subsistence emphasis to herding, citing only the topography and present-day land cover around the settlements as evidence (Rethemiotakis and Banou 1997: 50). Assumptions about the role of herding in the economy and its effects on LM IIIB settlement in western Crete by Godart also rest on the character of present-day landscapes (Godart 1972: 422; Godart and Tzedakis 1997: 155). Generalised discussions of the relationship of prehistoric settlement location and function in Crete (Bennet 1990; Moody 1992) have argued for a somewhat simplified, systemic combination of subsistence and macro-level political and economic factors as influencing settlement. While such simplification is valuable in discussing the long timescales the latter authors address, it means too little consideration is given to the variability and complexity of considerations affecting settlement in each period (see, in contrast, Cherry et al 1991: 4-9).

Through over-simplistic use of ethnographic analogy, LM IIIC site locations, often above the present limit of cultivation and in the zone of current intensive grazing, have given rise to assumptions that herding was a major subsistence strategy, and that the settlements were seasonal. The unsatisfactory nature of arguments for subsistence as the only mover in the settlement change has been noted by Haggis, but he still sees (large-scale) economic factors as primary (Haggis 1993; see Chapter 1.3 below). In contrast, Nowicki’s interpretations cite circumstances of insecurity/threat as the main mover. These circumstances are often reconstructed by him from the defensible attributes of settlements in a somewhat circular way (although contemporary evidence for political disturbance in the wider region also supports this view). All these explanations isolate only certain characteristics of the settlement pattern. It seems important to avoid over-formalisation of the data,<sup>3</sup> although its obvious unifying attributes tempt us to treat it as a pure reflection of prevailing sociopolitical and economic systems. Settlement must represent the endpoint of foregoing processes of sociopolitical development. At the same time, the forms of behaviour which settlement constrains/creates

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<sup>3</sup> Watrous has recently warned against this (*‘General Discussion’* in Karageorghis and Morris forthcoming). Shanks has generally criticised over-formalisation and the use of too-small units of ‘meaning’ in material culture to explain large scale social/economic change in EIA-C studies, where great regional diversity challenges the archaeologist (Shanks 1996: 142).



constantly feed back into and change social structure (see e.g. Lane 1987; Barrett 1999: 255-257; Shanks and Tilley 1987: 100-101).. In EIA Crete my study argues that settlement was a dynamic factor in its own right in long-term socioeconomic change, and I try to show how this relationship worked, examining various facets of settlement's meaning. The view of settlement as conditioned by, but also conditioning of, sociopolitical structure is in line with current general interest in the effects of cultural practice upon (past) society (e.g. Hodder 1982b: 151; 1987b; Shanks and Tilley 1987: 8-12; 72; 79-117; Ortner 1988; Hunt 1989: 7), now a regular part of *Annaliste* archaeological approaches (Birnbaum 1978; Bintliff 1991: 1-3; 10-13; Knapp 1992: 8-13; Moreland 1992; Sherratt 1992: 138).

### *Reasons to study economy, society and change in the EIA*

Although we have no textual evidence for Cretan states before the second half of the 7th century BC, we may assume state or proto-state structures to have been in existence there by the 8th century, as in the rest of the Aegean. This leaves a period of nearly 500 years between the decline of one complex social system and the emergence of another. Accepting that complex systems never return to a 'zero point' (Trigger 1998: 167), we have to characterise the EIA not as any kind of a gap, but as a period of fundamental sociopolitical and economic transformations (Snodgrass 1991b: 65; Whitley 1993; Morris 2000). EIA-Classical archaeology has been criticised as still too reliant on neo-evolutionary theories of social and economic change, where environmental factors or demography are seen as prime movers (Shanks 1996: 159; Shanks and Tilley 1987: 58-9). I try here to assess the dynamics of social change without assuming a hierarchical, systemic determination of environmental, subsistence, macroeconomic, power or ideological factors by each other (Gledhill and Rowlands 1982: 144-5; Shanks and Tilley 1987: 58-9; 176).

Economic activities are acknowledged to have been embedded in social systems and structures throughout the EIA (e.g. Finley 1973; Humphreys 1978; Qviller 1981; Snodgrass 1989; Winter 1995; Morris 1986, 1989, 1999). However, the same period was one of transformation in modes of exchange throughout the Mediterranean, with the Levant and Cyprus developing relationships with the Aegean very different from the highly-formalised, state-controlled transactions characterising the LBA (Sherratt and Sherratt 1991; 1993; Sherratt 1994, 1998). Undoubtedly, these changes deeply affected Aegean society. In particular, a late 10th-/early 9th-century increase in the availability of eastern luxury goods has been seen as a turning point for sociopolitical organisation. In undermining existing competition-based social systems, it is viewed as a primary stimulus for the rise of alternative institutions, foreshadowing those of the *polis* (see e.g. Morris 1987, 1997; Whitley 1991a). In a world-system context, increased goods flow from outside is unlikely to have had a simple, one-



way relationship with social change: new forms of social reproduction in the Aegean must themselves have continuously affected (via supply and demand) the character of interaction with the east. In the above respects, Crete is worth detailed study, since evidence shows it to have been in the forefront of Aegean contact with the east Mediterranean throughout the EIA.

### *The role of history*

'History' concerns the study in several senses: a) the recognition of social change as particular, contingent and conjunctural (Hodder 1987a; Shanks and Tilley 184-5; Trigger 1998: 159-67); b) a direct source of information about EIA society (in the sense of early Greek written history) and about land potential (in the sense of local land-use history) and c) historical consciousness as a important part of *mentalité* in the period under discussion (Whitley 1993: 225). My narrative attempts to bridge the gap between the very different socioeconomic structures and systems of 1200 and 700 BC through the examination of particular, complex *conjonctures*, but does not attempt to be a 'total history' (Febvre 1938: 2-4; 9; Braudel 1979: 901-3). Rather, it recognises the importance of identifying the contradictions and tensions within societies which constantly give rise to change (Shanks and Tilley 1987: 57-60; 182; Trigger 1998: 179).

An element arising out of various social and economic tensions in the EIA seems to have been the development of a *contemporary* historical sense, which helped both to create and to legitimise social change. Elements of this *mentalité* have already been extensively analysed in their archaeological and textual manifestations - from the development of ancestrally-referent tomb and hero cult to the emergence of pan-Hellenic identity and the importance of historically/ancestrally-identified *polis* identities in the rise of the state (e.g. Coldstream 1976; Snodgrass 1982b; Whitley 1988; Antonaccio 1995; Hall 1997; Morris 2000). I examine here how the emergence of historically/regionally based collective identities was related to socioeconomic change in Crete, and how closely both were bound up with settlement developments. Discussion of EIA *mentalités* can be enhanced through deconstruction of ancient texts, particularly those dealing with origin/foundation myths (Bintliff 1991: 5-6; Winter 1995; Sherratt 1996; Hall 1997; Morris 2000: 24-33). In demonstrating the importance of concepts of ethnicity/history/ancestry to social developments, these help to avoid the simplistic identification of 'real' ethnic groups in the EIA on the basis of artefact material alone (Snodgrass 1991b: 64). This is important with regard to Crete, where immigration has frequently been co-opted to explain aspects of the EIA archaeological record (see Hoffman 1997 for a recent discussion)

Interdisciplinary studies have been cited as essential to *Annales*-type approaches, which attempt to examine many-faceted, dialectic relationships between forces of change in past societies (Hodder 1987b:2; Bintliff 1991a: 1-2). Broad-scale social and economic history

and local ethnography/history, covering every period from the LBA to the 20th century, are used here to explore the nature of the long-term relationship between environment, subsistence, settlement and wider sociopolitical and economic structures in Crete, helping to avoid overly narrow, determinist interpretations.

### *Structure of this study*

The separation of the work into broadly 'subsistence' - and 'society/exchange' - focused parts does not relate to an interpretative separation of these facets, or to a notion of their conscious separation in the ancient past (Gamble 1981: 215-6). Part 1 sets the background of discussion, outlining the chronology of the period and the interpretative issues surrounding the archaeological record, particularly the previous theorisations of EIA settlement. It explores past and present relationships between environment, subsistence and wider social/economic structures in Crete - first through brief examination of the evidence pertaining to the natural environment and its productive potential during and since the EIA, and then through discussion of historical texts, which throw light on changing structures over time. It provides a background of general evidence about past land use and its traces which supports the six regional case studies presented in Part 2. The aim of these is the assessment of land capability in the immediate hinterlands of selected EIA sites. In conjunction with archaeological evidence, this allows potential subsistence strategies, and the importance of subsistence considerations, to be discussed with regard to the initial location and later development of EIA settlement. The importance of other factors in settlement relationships at the time are discussed in Part 3, through exploration of wider social and economic structures and systems. This is done using various forms of archaeological evidence, including cemetery material. The exact nature of interaction with the contemporary world-system, and the effects of this interaction on production and exchange contexts within Crete, are also addressed. Part 4 considers the development of settlement during the period of state emergence (PG-A). It attempts to explain some of the special socioeconomic conditions giving rise to the Cretan *poleis* by reviewing the regional archaeological evidence for the PG-A period in conjunction with previous scholarly observations on the rise of the *polis* generally, and with reference to some early textual sources for Crete.

### *Previous scholarship influencing this work*

My methodology and interpretative use of land potential assessment draws on the work of Bintliff (Bintliff 1977a, 1977b). Since Bintliff's work, studies of historical land-use have been regularly carried out as the background to intensive survey projects in the Aegean, with the aim of examining its relationship to settlement (e.g. Renfrew and Wagstaff 1982; Cherry et al 1991;

Runnels et al 1994; Mee and Forbes 1996). My fieldwork was in the general mould of these projects in that it aimed to look beyond the subsistence sphere, and to observe 'how changes in regional social and economic systems affect the organisation of production and the distribution of human and material sources in one small local unit.' (Cherry et al 1991: 11).

Ethnoarchaeological research, a way of relating known socioeconomic structure to land use practices, is a usual part of such studies, and was important in mine (van Andel and Runnels 1987: 23-4; Cherry et al 1991: 12; Whitelaw 1991). Discussion of the use and limitations of this kind of research in reconstructing ancient subsistence practice and its context informed my perspective (Halstead 1987, 1996; Halstead and Jones 1989; Forbes 1989, 1992; Sarpaki and Jones 1990). Rackham's and Moody's applications of landscape history approaches to Greece and particularly to Crete were influential on my use of historical texts to contrast structures of regional land use over time, their conclusions encouraging the avoidance of blanket assumptions about landscape degradation (Rackham 1982, 1990, 1992; Rackham and Moody 1992; 1997).

The work of Snodgrass, Morris, and the Sherratts has been important in demonstrating the EIA Aegean's inclusion in a broader Mediterranean world-system, the regionally-variable social impact of participation in such a system, and the multiple scales of sociopolitical and economic development which contributed to the emergence of the *polis* (Snodgrass 1971, 1980b; 1982a; Morris 1986, 1989, 1991, 1998, 2000; Whitley 1991a, 1991b; Sherratt and Sherratt 1991, 1993, 1998; Sherratt 1994; 1998). None of the above authors have dwelt in detail on Crete as a whole, rather than just Knossos, and I felt my study's consideration of other parts of the island might add something to the framework of reference they have established.

Two recent works which directly helped mark out the path for my study were stimulating articles by Haggis and by Whitley (Haggis 1993; Whitley 1991b). Both attempted to explain settlement in EIA Crete in the context of socioeconomic change occurring from the end of the LBA. They are discussed in detail in later chapters. I felt that a broader scope, examining contrasts and similarities in settlement between different areas of Crete, and the use of a wider and more consistent range of archaeological evidence, could be valuable in assessing the contributions of these studies, which were short and drew on a restricted base of data. Indeed, Haggis specifically recommended further regional studies to build on and develop his arguments about the motivations for settlement change c. 1200 BC (Haggis 1993: 165). In the case of Whitley's paper, which extrapolated from settlement types to social systems in EIA Greece, it appeared to me that not only a broader-based comparison of settlement patterns in Crete (from which several of his examples were taken), but a better theorisation of the exact relationship between settlement and society at this time, was needed.

The opportunity to broaden the scope of these studies in the present work is made possible by the recently-published or forthcoming results of regional intensive surveys in Crete, and by Nowicki's recent synthesis of evidence from nearly all of the known defensible EIA sites (Nowicki 2000). This book was published just as the present work was being completed, but I had previously read the manuscript (which collates much data previously published as articles; see Chapter 1.3 for references). Nowicki has provided a rich database of primary information and lucidly illustrated the defensible character of much of the new settlement pattern. However, he has rarely attempted to examine EIA settlement in its social or economic context at a regional or cross-regional level, or to discuss its long-term role in socioeconomic change (see Chapter 1.3).

### *Defining the 'regional' focus*

With reference to Crete, Bintliff has recently called for 'regional, intra-island, in-depth explorations of specific landscapes to get a surer feel for what our general interpretative problems come to at grass-roots level.' (Bintliff 1999: 6). The case studies I use to assess the role of subsistence concerns in EIA settlement attempt to do exactly this. The rest of my study, too, is concerned with the regional (island and intra-island) level, in its attempt to understand the specific factors contributing to socioeconomic change. However, restriction of the analysis of economic interactions to a regional scale, even for an island example, can be problematic, since they often integrate a much larger area (Braudel 1979: 168-352; Cherry et al 1991: 9). In the EIA, Crete's interaction with the wider Aegean/east Mediterranean sphere was particularly important in affecting the social changes it experienced. Within the island, too, it is still not possible to define political or economic regional boundaries in the EIA, as has been attempted for the LBA (Bennet 1985, 1990); interaction between consciously-defined social and economic groups can be seen to have taken place at a number of (overlapping) spatial scales. The detailed, diachronic study of settlement pattern proved useful in identifying these.

Notwithstanding these reservations, the island as a whole seems in this period (as in many others) a valid basic unit on which to focus analysis. A fairly uniform material culture and environment allow certain generalisations. It seems crucial to bridge the gap between regional period studies (like that of Haggis 1993) or the regional intensive surveys in Crete (which are limited in the generalisations they can make about any period) and very general analyses of the EIA Aegean, which can be extremely selective of spatially wide-ranging data (e.g. Whitley 1991b; Morris 1998). By incorporating six micro-regional case studies in a discussion of broader developments extending across and beyond the island, I hope to make it more difficult to arbitrarily select, without context, aspects of the Cretan EIA data to fit broader arguments which they may not actually support.

In some recent analyses of social development in the EIA Aegean, Crete is simply set aside as too large and complex for inclusion in the discussion. Because of its geoeconomic position and because it clearly followed a different political trajectory by the Archaic-Classical period, it can end up being defined negatively, as a template of contrast with other regions, without much further investigation (see, for example, Mazarakis-Ainian 1997; Foxhall 1995; Small 1998b; Morris 1998; 2000). I argue here that the 'different' character of Crete's cultural and sociopolitical development, its special position in relation to Aegean-east Mediterranean exchange, and the sheer amount of archaeological data for the EIA period which is now available all justify an analysis of the island on its own terms.

### *The role of process*

While the study is concerned with the particular and the historical, it does not avoid making use of cross-cultural comparison and processual models as tools in analysing socioeconomic change. (Trigger 1998: 167-79). Models of societal evolution, state formation, world-system interaction and diffusion all play a role in stimulating the narrative produced here. Morris has commented on the inadequacy of neo-evolutionary models for the rise of the state in the EIA Aegean, on the basis both of the degree of regional variation in sociocultural development and of the special, bounded character of the *polis* form itself (Morris 1998). Views of environmental/subsistence-related conditions/constraints as primary in sociocultural development are challenged in the present study, where analysis of macroeconomic/sociopolitical factors shows the latter often to have been more influential. Discussion of the limitations of these and other models here illustrates the continuing need to develop and test paradigms for 'gaps' between periods of complexity (cf. Trigger 1998: 167).

My study aims, through a focus on a defined region large enough, and a period long enough, to investigate and explain specific *conjonctures* between subsistence, settlement, and socioeconomic and political actions/motivations. It considers both the degree of process and the role of contingency in these *conjonctures* and in the later developments they produced. Its conclusions, and the special character of the *polis* form whose emergence marks the end of the period, together confirm that processual models can only partly describe or explain socioeconomic change in EIA Crete.



## Chapter 1.2

### Chronology of Early Iron Age Crete

#### *Defining the period*

Chronological terminology for this period in Crete has been recently much discussed (Coulson 1990; Mook 1993: 244-50; Haggis 1993: 133; Kanta 1997; Nowicki 2000: 15-18; Mook forthcoming, all building on the discussions of Desborough 1964: 166-96; 1972: 57-63; 1973). The term adopted for use here is the Early Iron Age, used in preference to 'Dark Age', although the two terms are usually in some senses understood as interchangeable (cf. the title of Haggis 1993). EIA is here used to refer to the period c. 1200 – c. 600 BC (the first texts known from post-LBA Crete date from c. 650-630 BC, and this point, at which the full emergence of the state form in Crete is first documented, is chosen as the rough end-point of the study; see Part 4). For Crete, the value has been recognised of starting a chronological unit of analysis at the beginning of the 12th century, in that this date represents a fundamental discontinuity in several aspects of material culture, seeming to reflect considerable socioeconomic change at the same period (Nowicki 2000: 15-17; Haggis 1993: 133). Whitley has put up a spirited case for chronologically isolating Dark Age studies to stress non-continuity with the Bronze Age, an aim with which most scholars would agree, but the attachment to a date of 1100 for the beginning of the 'Aegean' Dark Age perpetuated by both Morris and Whitley based on cultural changes at Athens, makes little sense in a Cretan context (Morris 1987; Whitley 1991a: 8-10; 1993: 226-7). From the beginning of the 12th century, discontinuity is clearly marked by widespread settlement abandonment and the foundation of new settlements, as well as by distinctive changes in ceramic styles through the 12th and 11th centuries (e.g. Kanta 1997; Tsipopoulou 1997a: 247; Hallager and Hallager 2000: 173-4; Nowicki 2000: 267-9). Many forms of cultural change are shared with the wider region, including the disappearance of written texts from the whole Aegean from c. 1200 BC, and the destructions and/or abandonments of major sites throughout the east Mediterranean (Ward and Joukowsky 1992). While developing out of LH IIIB/LM IIIB styles, ceramics across the Aegean show similar new elements (Mountjoy 1986: 134-200; Sherratt 1981). The period from c. 1200 until c. 1000 BC sees the initial uptake of iron in the area, as a value/prestige material whose socioeconomic role changed through the course of the EIA at varying rates in different regional contexts (Waldbaum 1978; Snodgrass 1980, 1989; Morris 1989; Sherratt 1994). In Crete, as in some

other areas, the 12th century also saw the first use of cremation as a burial rite, although to a very limited extent (see Desborough 1964: 187-9; Chapter 3.2 below).

Concerning the end-point for the 'EIA', we should recognise the arbitrariness of any selected date, while appreciating the reasons behind the regular selection of the 8th century BC (Whitley 1993: 225). Adherence to this framework does not mean that developments within the defined period need be treated as a unified set, which the term 'Dark Age' unfortunately tends to imply (Coulson 1990: 15). Various discontinuities clearly exist, but their significance depends very much on the analyst's point of view. Desborough and Snodgrass stopped the 'Dark Age' with the 9th century BC and the emergence of the Geometric pottery style; Morris has laid emphasis on a fundamental social transformation in the mid-11th century and what he has called an 8th-century social revolution (Morris 1993: 216); recently Osborne has chosen to address the whole period of the 12th - early 5th centuries as 'creating' Classical Greece (Osborne 1996). I will try to define changes within the EIA on the basis of cultural criteria most significant for societal change, since that is the object of this study. A distinct trajectory of cultural development in a combination of forms, particularly settlement, occurs in Crete through the 10th to the 7th centuries, providing the most significant subdivision in my diachronic analysis.

Since no new ceramic material is the object of study, the designations of pottery periods and the dating of individual ceramic assemblages are not closely discussed or disputed here. However, the dating of material within the EIA is naturally of great importance to the work, and some controversies surrounding dating and terminology need to be discussed, most importantly the use of the term Subminoan.

*Problems in ceramic chronology: LM IIIC, Subminoan, Protogeometric*

The question of how to identify Subminoan as a ceramic style and/or a chronological period is still open. Ceramics from Knossos were one of the most important starting-points in applying the term Subminoan to Cretan EIA ceramic assemblages exhibiting features wholly assignable neither to LM IIIC nor full PG (Brock 1957; Desborough 1964: 179; Warren 1983; Popham 1992). The same terminology was used at Phaistos and other sites in central Crete where, as at Knossos, it was possible to contrast the style with LM IIIC from the same site (Levi 1955, 1956; Rocchetti 1970, 1974; Desborough 1964: 182-4). On this basis, Subminoan was identified as broadly parallel to Submycenaean on the mainland, and articulated as a more or less distinct transitional phase, during which the first elements later characteristic of full PG started to be combined with LM IIIC styles. The term thus helped to separate the earliest phase of LM IIIC, characterised by the Close and Fringed styles, from the clearly-defined PG pottery

phase in Crete, starting in the early 10th century, and was suggested to have dated somewhere in the late 12th through the 11th century (Pendlebury 1939: 308; Desborough 1964: 167; 179). Desborough defined a set of positive ceramic attributes which he characterised as Subminoan (Desborough 1964: 192; 1972: 57-63). These included new forms - the trefoil-lipped oinochoe, the belly-handled amphora and a general ovoid tendency in shapes like jugs and stirrup jars - and a prevailing simplification of decoration, with banded and monochrome styles becoming important. Many Subminoan style elements were said to have a Cypriot origin (Desborough 1964: 32; 193-4; 231), and to have been diffused through migratory movements around the Aegean and east Mediterranean during the 12th century. Others were thought to have been exported from Crete to Cyprus at the end of the 12th/early 11th century (again by a physical migration).

Desborough explained the patchiness of classic SM elements in east Cretan assemblages at a date when they were well-established in Central Crete by a delay in diffusion linked to the physical isolation of the east part of the island (Desborough 1964: 172). Coulson (based on the excavation of a clearly stratified sequence at Kavousi Kastro) moved away from this view, suggesting that east Crete never really had a clear SM phase in terms of exact parallels with central Cretan pottery, although it did show elements of transitional style from LM IIIC to PG (Coulson 1990; Mook and Coulson 1997). Instead, he stressed contemporaneous regional variation in developments within the LM IIIC-PG tradition and noted 'the disadvantage of compartmentalising too easily these regional styles and of confining them to chronological boundaries which have no force.' (Coulson 1990: 10). The role of social context and of choice, rather than physical access or stylistic diffusion, in the production and consumption of this type of pottery has gained favour in recent years. Mook has suggested that at least for east Crete, the appearance of clear 'Subminoan' features mostly in tomb material indicates a ceremonial or funerary style rather than an island-wide chronological development (Mook 1993: 245; forthcoming).

The period before the full emergence of PG pottery in Crete and after that of the distinctive LM IIIC styles needs to be named, and Subminoan is the most commonly used term for this. But its absence on many sites - especially if defined only with regard to Knossos SM - is too ephemeral to signify a real chronological gap, though some scholars still characterise it in this way (Kanta 1980: 326; Andreadaki-Vlasaki 1991: 422). It appears that the best continued use of the term is on the understanding that it simply represents one form of the transition between late LM IIIC and PG, and may be restricted to particular consumption contexts. Because the attempt to more precisely delineate ceramic developments in the EIA is still ongoing, the use of the designation Subminoan outwith Knossos can make inter-site



comparisons complicated at second hand, especially when the term is used with minimal discussion. Confusingly, Catling has recently attempted to create a new variant on terminology and dating to fit the inception of a single unstratified site (the Knossos North Cemetery), putting a loose definition on the term Subminoan and extending its beginning back as far as the mid-12th century (Coldstream and Catling 1996: 206-7). This has been done against a background of analysis which tries to demonstrate the cemetery's foundation as something 'foreign' or 'new' to the existing LM IIIC cultural forms (Coldstream and Catling 1996: 715). For the rest of Crete, though, the mid-late 12th-century is much less representative of a cultural turning point than 1200 BC, as I have argued above. Tsipopoulou 1997b is a recent example of the continuing use of the term Subminoan for assemblages from east Crete, but offers no supporting discussion of the use of the terminology and of whether she considers this (tomb) pottery to be 12th- or 11th-century in date.

By the early 10th century BC, generic Protogeometric features are apparent in ceramic assemblages from all over the island. The earliest clear PG at Knossos co-occurs in tomb contexts with Attic MPG imports (Brock 1957: 189; Catling 1977: 12-14). Undoubtedly, Cretan ceramic styles were developing in a context of cultural innovation affecting a large area of the Aegean: the similarities of the PG style in different areas are an important form of evidence for continuous contact. However, too-strict assumptions about stylistic evolution produced the notion among some scholars that Attic LPG pottery found together with Knossian EPG indicates a 'delay' in the diffusion and uptake of the 'full' PG style in Crete and that the whole Cretan trajectory of ceramic development was a step behind Attica in a linear sequence until the MG period (Desborough 1972: 153-58; Coldstream 1977: 385). This scheme has some validity in representing distinct developmental courses for pottery styles in the two areas, but has the potential to be misleading in comparative dating (Coulson 1990: 10; Whitley 1991a: 84). The specialised context of meaning/use for imported Attic pottery at Knossos seen throughout the PG and G periods (Coldstream and Catling 1996: 715-7; Coldstream 1996; Chapters 3.2 and 3.3 below) argues in favour of regional and self-referent studies of stylistic development in Cretan EIA pottery, rather than too many implicit assumptions about processes of diffusion and imitation. Within Crete, cultural influence from Athens and elsewhere may have been mediated in many cases via local production at Knossos, given the early appearance and large quantities of Attic and other imported pottery there. PG settlement ceramics in east Crete show an increasing 'awareness' of particularly *Knossian* PG styles, rather than direct imitations of Attic forms, according to Mook (Mook 1993: 170; 245). However, we should still be wary of interpreting regional ceramic variation within the island in the context of diffusion/circulation from a single point.

*Dating Cretan EIA settlement material*

Outwith the canonical set of decorative and formal attributes, many subtle chronological and regional developments in ceramics remain to be studied, particularly in settlement material. Study of coarse-ware fabrics at LM IIIC-G Kavousi has proved valuable in delineating phases of ceramic change and in providing cross-references between settlement and cemetery material: studies of coarse fabrics from other survey regions will contribute in the same way (Haggis and Mook 1995; Hayden et al 1992; Whitley et al 1999: 244-9; Nowicki 2000: 17; Moody et al forthcoming). For example, an increased prevalence of incised, and later stamped, circles on pithoi, and the increasingly rough nature of herringbone incisions on raised bands on pithoi have been pointed to by Mook (Mook 1993, Mook pers comm) and Nowicki (Nowicki 2000: 267-9) as indicative of dates in the 11th to 10th, rather than 12th to 11th, centuries, although they do occur as early as the 12th century; such features are particularly useful in dating sites from surface material.

In this work I refer to many sites at which only surface studies have been done, as well as to excavated sites: at the former, dating is often provisional. Survey fieldwork has used various dating resolutions: the Kavousi and Praisos surveys made a special point of defining individual EIA phases (LM IIIC, PG, G, O/A) in surface material. Others are less specific; the generic term 'EIA' has been used in the Vrokastro and Ayios Vasilios Valley surveys to distinguish surface material of LM IIIC-G from that clearly belonging to the (Late) Bronze Age. Nowicki has attempted to create a chronological sequence corresponding to his typology of EIA defensible settlement forms (Nowicki 1992b, Nowicki 2000: 224-247; Nowicki forthcoming b; see Chapter 1.3 below). This may be useful to back up tentative ceramic datings at this type of site, and in general interpretation. The correlations between settlement type and pottery still require further testing, though, and the scheme runs a risk of being circular in its application. Where the term LM IIIC-SM or LM IIIC-PG is used in my study, the meaning is the same in both cases: the material does not include PG elements (or includes a proportionately very small amount of them) but appears to span the whole range of LM IIIC, i.e. the period from 1200 to the early 10th century. Progress has recently been made in the refining of ceramic phases within LM IIIC, using newly-excavated material (and restudied old material) from sites such as Kavousi Kastro and Vronda, Chania Kastelli, Thronos Kefala, Knossos Stratigraphical Museum and North Cemetery, Monastiraki Katalimata and Chalasmeno (Mook 1993; Coulson and Mook 1997; Coulson 1997; Hallager and Hallager 2000; Prokopiou 1991, 1997; Warren 1983; Kanta 1997; Coulson and Tsipopoulou 1994; Borgna 1997). For example, the stratigraphy at Kavousi Kastro had four phases, dating

between early LM IIIC and PG, which are of great importance in isolating diagnostic details in regional ceramic development.

Because the early PG period is a 'watershed' in settlement and in sociopolitical development in Crete, it would be useful to be able to identify PG phases in surface material (i.e. coarse wares) more accurately than is possible at present. Detailed pottery chronology from the start of PG to the Archaic period has been studied from both tomb and settlement material (e.g., Levi 1931; Rocchetti 1970; 1994; Watrous 1980; Rizza 1983; Gesell et al 1985: 327-55; 1991: 167-77; 1995: 92-115; Stampolidis 1990; Mook 1993; Catling and Coldstream 1996; Tsipopoulou 1997; Hallager and Hallager 1997b). However, much research remains to be done on the regional and individual ceramic chronology of settlement in this period.

### *Correlations and absolute dating*

There is a poverty of direct correlations to absolute Near Eastern chronologies for Cretan 12th-11th century pottery. The best-known tie-in for late LM IIIB is the very late LH IIIB pottery from Deir Alla, in a context dated to c. 1190 or later: there does not seem to be a significant time lapse between LM IIIB on the mainland and in Crete, suggesting that the LM IIIB-C transition happened at the turn of the 13th century (Warren and Hankey 1985: 158-62). An Egyptian scarab found at LM IIIB Poros dates to the mid-13th century (Kanta 1980: 4). Apart from these markers we have little way of measuring the duration of pottery phases from c. 1200 to c. 1000 BC in Crete. With the increase in Near Eastern imports to the Aegean by the 10th-9th centuries, dating correlation becomes easier, although the deposition of heirloom imported objects in tombs is sometimes a complicating factor. We are able to use the intra-Aegean movement of ceramics to put 10th-century and later Cretan developments into a solid chronological framework relevant to Attica and Euboea, where ceramic dating is also clarified by Near Eastern imports from the 10th century onwards (Coldstream 1977: 385). Full Geometric is considered to start c. 900 BC in Attica, while in contemporary Crete, MPG, LPG and PG 'B' pottery phases have been identified as covering the period up to 800 BC. As I noted above, because what we are really seeing is different lines of contemporary development in each area, the use of the same ceramic labels becomes confusing. It often seems better to talk in terms of centuries when discussing Crete from the 10th century onwards.

### *Conclusions*

Some cultural discontinuities in the Cretan EIA seem likely to have been integrated with profound changes in society and economy and are used throughout this work as chronological reference points for complex forms of change. This approach to the period does not usefully fit

to its frequent presentation in previous older works of scholarship as a unified era of decline or a dark 'gap' between two forms of developed civilisation. But neither does it benefit from a strict and exclusive emphasis on pottery phases refined down to under 50-year periods. The most useful units of chronological analysis for this particular study are fairly broad: 1) c. 1200 BC to the early 10th century and 2) the 10th century through the 7th century.

Absolute dates for the Cretan EIA suggested by Haggis (Haggis 1993: 167) and Coldstream (Coldstream 1979: 385) are as follows:

<b>Period</b>	<b>Approximate date BC</b>
Late Minoan IIIC	1200-1100
Subminoan	1100-970 (see reservations above)
Protogeometric	970-850
Protogeometric B	Haggis gives PGB-(M)G as 850-750; 835-810 (Coldstream);
Early Geometric	810-790 (Coldstream)
Middle Geometric	790-745 (Coldstream)
Late Geometric	750-700 (Haggis); 745-710 (Coldstream)
Transitional	710-700 (Coldstream)
Orientalising	700-600
Archaic	600-500

## **Chapter 1.3**

### **The nature and significance of the LM IIIC settlement shift - the history of interpretation**

This chapter introduces a question already brought forward as crucial to the study - what is the meaning of settlement distribution and form, and changes in these, during the EIA of Crete? A brief outline is given here of the nature of the changes, and of explanations for their causes and consequences which have been offered by various scholars. The first change under consideration in this study is the movement to defensible sites c. 1200 BC. Nowicki's recent book forms the best source to date for this phenomenon (Nowicki 2000). The work's interpretative point of view is of a single embracing cause for the settlement movement, which has pervaded the author's research strategy. As I shall discuss below, the foundations of Nowicki's interpretation were laid by earlier scholars, and in fact have constituted the dominant theorisation of the phenomenon since its earliest recognition. I also examine alternative interpretative approaches which have recently been adopted, as the evidence for defensible settlement pattern from extensive surface studies has been looked at in conjunction with the results of excavation and intensive regional survey.

#### *Nature of the evidence for the shift*

Because the 1200 BC settlement shift is discussed in detail by recent publications, and many aspects of it will be examined in more detail in Chapters 3.1 and 4.1, I will avoid reiteration of detailed data here. However, an outline of the phenomenon and its evidence base is a necessary introduction to my study.

All sites so far identified from excavation or surface material as having an occupation phase in LM IIIC-SM are shown in **Figure 1.3-1**. The vast majority are new foundations in this period. The dating is always taken from the most recent study of a site (see the accompanying notes for the sources used). Although most of the new sites have a distinctive defensible topography, with extreme local inaccessibility (being perched on top of rocky knolls or platforms surrounded by cliffs) and/or strategic locations (commanding views over approaches from the sea or from adjoining valleys) their immediate hinterlands often differ substantially from each other in altitude, topography, soils, and past and present land use. There are few sites over 1000m above sea level (asl), and most lie between 200 and 700 m asl, with many of the higher sites known being located in the Lasithi mountains. Thus the zone occupied by the majority of defensible settlements does not belong to the true uplands, but to the foothills. There are numerous sites within half an hour's walk of the sea or actually on the coast. In some areas, 'clusters' of two to three sites can be identified within a radius of c. 1 km of each other



(Haggis 1993: 150-1; Haggis forthcoming). Chronological and tentative functional distinctions can be sometimes be made between sites in the same cluster. At Oreino, for example, we see three strategically-located sites above an inland-running valley route; one of these, which is extremely small and which commands the entrance to the valley (Petroskopia) is suggested to have been a watch-point (Nowicki 1990: 170-174). At Kavousi, Monastiraki Katalimata and Chalasmeno and perhaps Pefki, it may be that one inaccessible and space-limited site was used as an initial refuge place (in the earliest part of LM IIIC), with a slightly later, larger and more accessible, sometimes longer-lasting settlement developing nearby (Coulson 1997; Haggis and Nowicki 1993: 303, 334-6; Coulson and Tsipopoulou 1994, Nowicki 1994a, b; Nowicki 2000: 64-69; 90-97). However, the chronological overlap is different in each case, with the settlement at highly-defensible Kavousi Kastro continuing beyond the lifespan of the less defensible and later-established one at Vronda, for example. At Tapes (see Chapter 2.2 below and Nowicki 1988: 194-5; 2000: 123-7) a high, space-limited and very defensible site is contemporary with a nearby much larger, less defensible one and may have been a shared place of retreat in times of heightened insecurity. In other cases, we see not so much clusters as a fairly dense network of differently-sized settlements, as for example around the Karfi-Gonies area<sup>1</sup> and in the Ayios Vasilios valley (Nowicki 1995b; Nowicki 2000:147-166; Chapter 2.2 below; Moody et al 1998a, 1998b, forthcoming; Moody pers comm). Fortifications are sometimes found at LM IIIC-SM settlements (Hayden 1988; Nowicki 1992b) but they are by no means a standard feature, nor do they appear to cross-relate with size, date within the EIA or region, although local topography does play a role - fortifications are sometimes provided only on the most open/accessible side of a site.

A few points in the data are perceived as salient by most analysts. These are the widespread establishment of *new* settlements in LM IIIC, and a strong degree of contrast with LM IIIA-B settlement, in terms of relative proximity to the sea and to the largest areas of prime arable land in the island - both less accessible from the new sites. Relative dispersal in comparison to LBA settlement is also a feature of the new pattern (Haggis 1993: 158). Views over communication routes and a large area of surrounding countryside - i.e. strategic positioning - seem another common characteristic (Hayden 1988: 19). However, some of the concepts mentioned here as associated with the new sites, such as inaccessibility, remoteness, defensibility, and 'refuge' may be seen to require better definition: their application to the data is not fully theorised (although Nowicki's most recent work has done something towards this;

<sup>1</sup> This well-known EIA site in the northern Lasithi mountains, otherwise referred to as Karphi or (by Nowicki 2000: 157) 'Kera Karfi' is hereafter referred to thus.

Nowicki forthcoming b, 2000: 14-15), and is still debated (see e.g. Mook, Warren in Hallager and Hallager, eds., 1997: 369). Further exploration of these terms seems needed in order to understand which attributes were most significant in the new settlement foundations.

Conversations I had in the course of fieldwork showed that those people who work and live in the vicinity of the sites differ in their perceptions of them from people living in Cretan cities, as well as from (past and contemporary) archaeologists. The first group often treat the sites as parts of work areas linked by bulldozed tracks and thus as familiar, rather than remote and isolated. However, even these people still perceive some of the sites as arduous and difficult to go to (i.e. to the peak of, where the settlement area usually is) on foot: the work carried out around the sites, of mixed agriculture and grazing, does not usually involve journeys to difficult summits and where this is necessary, bulldozed roads usually provide access. More extreme perceptions of the remoteness of these locations (on the part of non-locals) seem to arise in contrasting them with modern nucleated villages or towns occupying coastal or lowland plains, the centres of much social and economic activity in Crete today. Contrasts with LM IIIA-B, traditional and modern settlement locations are often deliberately exaggerated by archaeologists to emphasise the clear and widespread nature of the shift, sometimes leading to the impression that the majority of defensible sites are in or on the mountains, belonging to a completely different topographical/ecological zone. In interpretation, notions not only of remoteness from 'civilisation' but also of what constitutes civilisation - i.e. proximity to the best arable land, direct access to communication routes - can colour views of the implications of the new settlement distribution for EIA society and economy. In terms of relating the sites to each other, the state of research itself has in the past unduly influenced perceptions of the significance of individual sites. For example, Pendlebury's characterisation of Karfi as an important city was echoed by Desborough (Desborough 1972: 57-63), although we now know settlements of this size and character were not very unusual, particularly in the Lasithi area.

Other forms of settlement existing in this period must of course be considered in all their aspects when assessing the meaning and importance of the defensible settlements (Kanta 1980: 326). The continuation of occupation at many important LBA sites into the first half of LM IIIC (e.g. Knossos, Phaistos, Chania, Archanes, Tylissos, Kastelli Pediada, Malia, Amnisos, Katasambas, Chamalevri (Hood and Smyth 1981: 11-13; Warren 1982-3, Sackett et al 1992; Rocchetti 1970, 1974; Hallager and Hallager 2000; Sapouna-Sakellarakis 1990; Sakellarakis and Sakellarakis 1997; Kanta 1980:9-13; 38-43; Rethemiotakis 1997a; Driessen and Farnoux 1994: 62; Farnoux 1997; Schäfer et al 1992; Alexiou 1955; Andreadaki-Vlasaki 1994, 1996). Other contemporary settlement forms include small rural or satellite non-defensible sites, probably connected with farming, in the vicinity of larger defensible

settlements. The character and development of various forms of EIA settlement will be discussed in more detail in Chapter 3.1.

If the movement to defensible sites c. 1200 BC is a phenomenon with long-lasting implications, representing and conditioning a whole new set of socioeconomic and political changes, the second shift, occurring in the early to mid 10th century, illustrates both the first shift's lasting effect, and the relationship between socioeconomic change and settlement during the rise of complex systems. However, the second shift has been paid little attention outside of Nowicki's work (except on a regional basis; e.g. Rocchetti 1994; Haggis 1993, forthcoming) and its nature, context and meaning are discussed in detail here (Part 4).

#### *The refuge model*

Nowicki has constructed defensible settlement through the period LM IIIC-Geometric as a chronological and contextual signifier along the following lines: a partial movement to or periodic use of often dramatic, sometimes short lived, refuge places in the late 13th/early 12th century while many of the existing LM IIIA-B nucleations were still occupied, followed by the widespread establishment/permanent occupation of extremely defensible sites and the abandonment of most LM IIIA-B settlements (early 12th century). A degree of depopulation for the island as a whole is tentatively suggested at this time. There then seems to be an expansion of the pattern to include some slightly less defensible sites, with a complex network of defensible settlement in place throughout the island by the mid to late 12th century. By the late 11th/early 10th century a 'recovery', linked to a slackening of threat as well as some influx of people from mainland Greece, is identified with a wholesale move down or away from defensible sites. Economic development, plus the rise of conflict within the island, are cited as subsidiary movers in this change. Throughout his work it is apparent that Nowicki views LM IIIC-PG settlement pattern generally as determined by degree of threat from outside, and some details of the pattern as related to migration to or from the island. The latter interpretation (more broadly an interest in spatial distributions of settlements and/or cemeteries as indicators of separate ethnic groups) is echoed in other work on EIA Crete (Demargne 1947; Willetts 1955:47; Warren 1982-3: 83; Kanta and Karetsou 1998; Catling 1995: 128; Coldstream and Catling 1996: 715). Nowicki's focus exclusively on defensible sites allows him to make such correlations without considering cultural context or how such explanations fit to other settlement evidence for the period. The influence of what I shall call the 'refuge model' built up from the earlier twentieth century for Crete are clearly behind his views, as we shall see from the analysis below. I start with Nowicki because his discussion is by far the most detailed and



wide-ranging to date. However, the formalising tendency and somewhat narrow explanatory range of his work leave plenty of scope for discussion and further research.

Sites of EIA date and defensible character were first observed and discussed in an archaeological framework at the same time as the discoveries of the Minoan palaces (early characterised as centres of ‘civilisation’). This undoubtedly heightened the perceived contrast in the character of the EIA sites, as discussed above. Two of the most important excavations of LM IIIC defensible sites took place in the early 20th century (Boyd 1901; Hall 1914). Boyd excavated a complex of Iron Age sites and tombs around Kavousi, and Hall excavated Vrokastro and its cemetery, both in the Ierapetra isthmus of east Crete. Kastro and Vrokastro were remarked on by both archaeologists for their defensible and inaccessible characteristics, Kastro (c. 700m asl) on a steep-sided rocky peak at the edge of the west Siteia mountains and Vrokastro on a much lower but cliff-surrounded peak (313m asl) above a coastal promontory (**Figure 1.3-1**). Both sites and their associated tombs contained material of LM III through G date, and the excavators were able to make broad distinctions between ceramic material of various periods which largely hold good today, although there has been much refinement of the pottery sequences (see previous chapter). Boyd’s excavations at Kastro were cited by her as reinforcing an explicitly-stated model, perhaps the earliest form of the refuge model: ‘[given the fact that] the people of the Bronze Age preferred to dwell in the lowlands, while their ruder successors at the opening of the Iron Age retired to the mountains for security, we may expect to find Mycenaean and pre-Mycenaean remains in Kavousi plain, and Geometric settlements on the heights above’ [‘Geometric’ is used by Boyd to refer to the sites we now recognise as starting in LM IIIC].

As Boyd was working, similar observations were being made in the far east of Crete on unexcavated defensible sites at Zakros Ellinika, a rocky knoll c. 160 m asl in the Zakros Gorge and at Palaikastro Kastri, a low coastal promontory, with the same interpretative slant. Hogarth observed of Zakros Ellinika that ‘hot, beset with flies and remote from the arable lands, [it] must have been chosen under pressure of great danger’ (Hogarth 1901: 145), while Bosanquet interpreted the desertion of the site of Palaikastro Roussolakkos, and the establishment of occupation on the hill of Kastri, as follows:

‘unwalled towns and villages on the coast were forsaken and the population withdrew to the hills, a handful of the old inhabitants lingered on the safer hill-top...Palaikastro, like many other cities on the coast, was abandoned when Crete lost her control of the sea.’ (Bosanquet et al 1903: 289).

The ideas prominent in interpretations of the settlement pattern by early excavators were later perpetuated by Pendlebury, whose special interest in the period led him to investigate what is

still the largest excavated LM IIIC defensible site to date, Karfi. Pendlebury interpreted the pattern thus: 'The map shows an extraordinary change after LM III. Most of the coastal sites, particularly in the South, have been abandoned. Few of the inland towns have survived. Their inhabitants have fled to mountain eyries.' (Pendlebury 1939: 303).

These sites are referred to elsewhere by him as 'castles of robber barons', where 'The one concern is inaccessibility.' (Pendlebury 1939: 16). His interpretation reflected previously-established views of the reasons behind the settlement shift - piracy or other threat from outside, and thus insecure coastal areas - although even within his work there seems to be a confusion as to whether these inhabitants of the new sites were generally aggressive or passive actors in the drama.

The interpretative context just outlined was little challenged in the years before 1980, during which various excavations at LM IIIC sites of both defensible and non-defensible type were undertaken. These included Chania Kastelli, Knossos Stratigraphical Museum and Unexplored Mansion, Palaikastro Kastri, and Kastrokefala Almyrou. The work made valuable contributions to refining the pottery chronology, as I mentioned in the previous chapter (Warren 1983; Hallager and Tzedakis 1988 (see Hallager and Hallager 2000); Popham and Sackett 1965; Platakis 1970; Alexiou 1973; Sackett et al 1994)<sup>2</sup>. A few questions continued to be posed about the meaning and detail of the settlement shift and its relationship to social and economic context (Desborough 1972: 128; Kanta 1980: 325-6).

#### *Research and interpretation since 1980*

New developments and approaches in research to EIA Cretan settlement stemmed from several sources, including a renewed interest in the so-called 'post-palatial' (LM IIIA:2-IIIB) period in Crete and in how the island was organised politically and economically at this time (Hallager and Hallager, eds., 1997; Driessen and Farnoux 1997). Kanta's study was very influential in collating information on this period and, since it analysed only pottery, in drawing complementary interest to settlement location and type (Kanta 1980). Re-examination of the previously excavated sites at Kavousi and Vrokastro, and survey in their vicinity, led to the development of expertise in EIA settlement ceramics (Hayden 1987; Hayden et al 1992; Coulson 1997; Gesell et al 1983, 1985, 1988, 1991, 1995; Day et al 1986; Haggis 1992, 1996). Excavations of sites of defensible type also took place elsewhere in the island (Prokopiou 1991, 1997; Rocchetti 1994; Hatzi-Vallianou and Parchapidis 1999). The development of intensive survey in Crete meant that much new information on EIA settlement

<sup>2</sup> The pottery from Karfi was also restudied (Seiradaki 1960).

patterns was being discovered. This required study and interpretation in the light of the refuge model, as well as recognition of the complex interplay of subsistence, macroeconomic and sociopolitical factors in settlement which survey research highlighted (see above and Nixon et al 1988, 1989, 1990; Haggis 1992, 1996, forthcoming; Watrous et al 1993; Whitley 1998a; Whitley et al 1995, 1999; Watrous forthcoming a, b and c; Moody et al 1998a, 1998b, forthcoming). Above all, it was the increase in the number of known sites which demanded that the phenomenon be given more attention. Nowicki's fieldwalking, specifically targeted on defensible sites, was responsible for the largest amount of new data on settlement in the period (Rutkowski and Nowicki 1985, 1986, 1987, 1990; Nowicki 1987, 1988, 1990, 1991, 1992a, 1992b, 1993, 1994a, 1995a, 1995b, 1996, 2000).

The renewed attention led to the development of more diverse models for the causes and consequences of the settlement shift. Scholars involved in the Kavousi project brought forward an emphasis on economic factors behind the shift, based on the valuable recognition from their palaeoeconomic data that a broad-based subsistence regime characterised the Kavousi sites, and that the site hinterlands, contrary to some perceptions, were high in agricultural potential and water and had been traditionally exploited for agriculture. They also usefully considered the implications of changes in wider economic and social context at the end of the LBA on subsistence and settlement, e.g. the lack of the political infrastructure needed to maintain complex irrigation<sup>3</sup> and redistribution schemes. Their arguments assumed that settlement was mainly determined by subsistence considerations, but they were careful to limit conclusions to their own studied region. While these interpretations played down response to threat as a factor in settlement they did not ignore the potential role of this element.

'The new location of the settlements in the mountains was no doubt dictated in part by considerations of security, for the 12th-century Aegean must have been a dangerous place. But access to water and arable land were of equal importance for the siting of the IIIC villages of Kavousi. Agriculture on the plain of Kavousi requires irrigation, which may no longer have been feasible, but on mountain terraces the soil is good, terracing helps to retain water, and the terraces themselves require little upkeep. The people of Kavousi were obviously reverting to a simpler economy, based on subsistence farming and without much exchange with larger centres, and they thus moved nearer to their resources and farther from the sea, which no longer offered the promise of exchange, but only danger.' (Day 1997: 404).

Coulson commented

<sup>3</sup> Such schemes are not clearly evidenced for LBA Crete.

‘The sites are up high, but you have to remember that much of the settlement pattern in Crete throughout all periods was up into the mountains. Some of these sites may be seasonal, summer inhabitations. It has long been the practice to go up into the mountains in the summer. So, some sites may be seasonal, some may be defensible, but I am convinced that the primary reason for their existence is water. The good springs are up in the mountains. In the plains you do not have much available water.’ (Hallager and Hallager, eds, 1997: 397).

While some views focused on changing agricultural strategies, others suggested that many of the new settlements might be bases for seasonal herding. They used the sites’ mountain locations (and often little else) to support the thesis (Watrous 1977: 2-3; Hood and (Andreadaki-) Vlasaki in Hallager and Hallager eds., 1997: 399). Climate change (which is neither clearly evidenced or theorised in its effects) was also included in some explanations of the settlement change (e.g. Andreadaki-Vlasaki 1991: 421).

Haggis, while in general supporting the notion of an economic impetus to the settlement shift and limiting himself to the Kavousi region for his analysis, went much further in exploring the complexity of the phenomenon and its social and economic relations, and, equally importantly, posing questions about its later consequences. He framed his discussion in the light of Snodgrass’s emphasis on the need to examine the ‘positive adaptive accommodation’ of Iron Age communities to changed circumstances - using local ethnography and historical analogy to put the settlement pattern in its long-term context (Haggis 1993: 133, citing Snodgrass 1987: 184-88). In doing this he showed the weakness of a seasonal model for the Kavousi EIA sites. Small, seasonal agricultural settlements are currently used in conjunction with large, nucleated year-round villages in the region, but this high-contrast pattern is not characteristic of either EIA or traditional settlement there. Analogy was also used by Haggis to support the case that a lack of water available in the Kavousi plain without extensive deep well-digging (an improvement made only in the post-World War II period and associated with nucleated settlement and extensive land use) was part of the stimulus for the move up to the spring zone (see also Haggis and Nowicki 1993: 336; Day, cited above). The characterisation of the plain as underproductive was the basis for his suggestion that small, dispersed, subsistence-orientated EIA settlements found optimal environments at the higher sites, as in the traditional pattern of permanent settlement. The centralisation of political control and economic activity and a reduced need to grow some staple foodstuffs locally post-WW II has entailed relocation to the coastal plain for permanent settlements. Haggis suggested that the settlement shift in LM IIIC-SM and a move back closer to the coasts by the Archaic period related to similar factors (Haggis 1993: 159-60).

The concept of stable settlement *systems*, as opposed to unstable individual settlements (the latter suggested as characteristic of the early EIA by Whitley 1991b: 346-7) was brought forward by Haggis with reference to examples of clustered sites in the Kavousi area and elsewhere, whose component parts together span the whole EIA period (Haggis 1993: 159-60; 164-5). He saw the clusters formed by groupings of small settlements within 1 km of each other at Avgo, Kavousi and Monastiraki, as representing extended kin groups in a close co-operative association. He drew parallels with other clusters of the same date in the West Siteia Mountains region, but his study missed the chance to examine the cluster phenomenon in relation to specific regional topography and environment, or to make comparisons with other parts of the island.

Haggis's work, perhaps to redress the balance with the dominance of the refuge model as described above, barely discusses the significance of defensibility in sites of this period. Although his study region includes highly defensible sites, their attributes are not discussed by him in relation to motivations or consequences of the settlement shift. In contrast, Nowicki's most recent views have not departed much from his long-held conviction of a response to insecurity as the main imperative to settlement change, and thus from the traditional refuge model. However, he has spent much time in developing the settlement chronology and in elucidating the typological distinctions in the settlement pattern referred to above (Nowicki forthcoming b) and has paid attention to the subsistence consequences of the shift (though without citing any new evidence, making inter-settlement comparisons, or considering wider economic and social structures and systems) in a recent paper about Karfi (Nowicki 1999). Socioeconomic context is now increasingly discussed in connection with the phenomenon, and it is being assessed from cross-cultural perspectives and in its own regional context of the 12th-century Aegean. Recent approaches include the interpretation of the new sites as symbolically meaningful landscape elements, and the modelling of site location with regard to contemporary social organisation, macroeconomic context or subsistence, using a variety of types of archaeological evidence (e.g. Whitley 1991b; Whitley et al 1999: 251; Haggis 1999; d'Agata forthcoming; Karageorghis and Morris forthcoming; Vavouranakis forthcoming; Wallace forthcoming a, b).

What still remains to be considered is the long-term relationship between socioeconomic change and settlement at scales both within and across Crete, taking into account wider developments within the Aegean/East Mediterranean area. A more integrated treatment of different elements of the archaeological record seems demanded in the interest of modelling change, as discussed in Chapter 1.1. In particular, goods production and exchange (and their relationship with subsistence), and social change connected with state emergence

have not previously been considered together with the full range of data on settlement change in EIA Crete. As I have mentioned, the various narratives of the reasons for the settlement shift c. 1200 BC are often rooted in various non-explicit preconceptions. In the course of this study I want to re-evaluate some of these and thus adapt and enrich the 'refuge' model (and other models of settlement change discussed), extending them to cover much more than an event history.



## Chapter 1.4

### The physical framework: evidence for past and present environment and land-use in Crete

#### *The role of the environment*

It is often impossible to divorce natural from cultural landscape in Crete, where man's impact on the environment has been all-pervasive since the Neolithic period (see e.g. Grove et al 1992; Rackham and Moody 1996). Environmental conditions have been important in, but never wholly determinative of, past economic systems in the island, as we shall see in this and the following chapter. Both examine the long term relationship of environment to settlement and subsistence practice. In the present chapter I focus on evidence which can be used to reconstruct the character of Crete's environment and the parameters for subsistence activity in the EIA. Discussion of the geology, Holocene geomorphology and ecology of the island is the background to this. I end by looking at published archaeobotanical and faunal assemblages from EIA sites, which broadly indicate the prevailing environmental conditions and available species ranges, and give some indications of subsistence practices.

While these types of evidence tell us about the effects of past human interaction with the environment, they say little or nothing about the social and economic systems through which land use practices were mediated. Nonetheless, basic characterisation is necessary in order to appreciate how variously the landscape could be used, and what constraints it imposed (Alcock 1999).

#### *Geology, drainage, geomorphology and soils*

Bonnefont describes the geology of Crete in detail (Bonnefont 1972; see also Fossoulas 2000). Palaeozoic platy limestones and metamorphic rocks (referred to variously as 'schist' or phyllite-quartzite), with igneous intrusions in some areas, underlie layers of Mesozoic limestone, forming the mountainous areas of Crete. Much faulting has taken place in these, with uplift and folding of the layers often visible. The lower-lying areas are mostly formed by Tertiary marl, clay and conglomerate deposits, representing marine transgressions which covered inland valleys and lower hilltops (reaching up to c. 800-1000m asl in places; Bonnefont 1972: 115-46). On exposed areas, many of these softer rocks have now been almost completely eroded, leaving the hard limestone visible.

Quaternary frost weathering above c. 1600-1800m asl created many of the major scree deposits and rock falls (Bonnefont 1972: 147-157; Katsikis and Allen 1992), but there is no evidence of real glaciation outside the Psiloritis range. In the Holocene, karst processes have affected the areas of hard limestone, producing *poljes* (raised plains surrounded by limestone

hills), caves, and subterranean drainage systems. These have great significance with regard to available water reserves: groundwater drains through the permeable limestone to emerge on a springline where it meets impermeable metamorphic rock. The water table has fluctuated considerably over time. The 'Little Ice Age' of the 16th to 17th centuries saw more year-round rivers in Crete than there were in the 19th century or are today, and presumably greater volumes of water in the springs (Grove 1992; Rackham and Moody 1996: 20-22; 40-41; Moody forthcoming). The geological wells recently used to provide water for intensive agriculture have reduced the water table in many areas, so that spring and river volume is lower.

Several studies in Crete have been concerned with dating geomorphological events as the background to archaeological survey projects, including Bintliff's for the Ayiofarango valley in south central Crete and Pope's for the western Mesara, in the same region (Bintliff 1977a: 605-77; Bintliff 1977b; Pope 1993). These studies agree on a major post-Roman alluviation phase (see also Roberts 1979; Roberts 1981: 5 for the Iraklion basin). Bintliff concluded that the Ayiofarango geomorphology basically conformed to Vita-Finzi's model<sup>1</sup> of the Older and Younger Fills, with major phases of deposition taking place in the late Pleistocene and again in the post-Roman period. He attributed a very limited role to anthropogenic soil erosion before this latter phase. Pope's Mesara study showed, in addition to the same two main phases, a smaller, but significant, Late Neolithic phase of alluviation and other small peaks through the BA and later - corresponding more closely to mainland Greek profiles - and suggested anthropogenic causes (see Butzer 1974; Bintliff 1977a: 35-59; Wagstaff 1981; Davidson 1981; Rackham 1982, 1996; van Andel et al 1986; van Andel et al 1990). Moody suggests, on the basis of studies in the Ayios Vasilios valley in west Crete, and the Meseleros valley in the Ierapetra isthmus of east Crete, that significant downward movement of material onto the valley floors has taken place over all periods since the Bronze Age, without isolating a specific major deposition phase (Moody forthcoming, Moody pers comm). Other recent studies of Aegean geomorphology have also seen the 'Younger Fill' as a regional and recurrent phenomenon rather than a unitary one, and Crete would seem on present evidence to best fit this model (Davidson 1980; Wagstaff 1981). BA erosion probably remained small-scale, although with various peaks of greater intensity. This stability, as Bintliff notes, may be attributable to soil management measures, such as terraces and check-dams, coming into use in the period (Bintliff 1977a: 613). A phase of Neolithic/EBA deposition may have helped build up soils in areas like the Iraklion basin, Mesara, Chania, and Malia plains. During

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<sup>1</sup> Vita-Finzi 1969.

the Middle-Late Bronze Age, the presence of large settlements in these areas suggests they already provided stretches of fertile, deep and stable colluvium. Later deposition events covered the remains of these settlements to varying depths (1-2m in many areas). In reconstructing the LBA/EIA Cretan landscape, then, we can generalise that there is likely to have been greater depth of soil on the hillslopes, and rather less in the coastal plains and valleys, than there is today (Hamilakis 1995: 85). The results of recent studies around EIA sites by Morris tend to confirm this conclusion (Morris 1994; Morris et al forthcoming). A buried soil horizon in the Kavousi plain, c 0.88m below the present surface, gave a date of 3000 years BP, showing significant deposition since that time.

The position of Crete near the junction of two continental plates means that the island has periodically been affected by tectonic movements. The west end has risen by about 8m since the Hellenistic period (Rackham and Moody 1996: 195). Archaeological studies around sites on the coast, such as Kommos, Mochlos and Petras, have produced somewhat conflicting theories on relative sea level in the LBA. The regional differences may arise from local geomorphological events in conjunction with sea level rise (Davaras 1974; Soles et al 1992: 417; Watrous et al 1993: 204; Tsipopoulou 1997b: 235). They mean few meaningful generalisations can be made about LBA-EIA coastlines.

Study (including chemical characterisation) of a range of typical soils has already been undertaken for Crete (Nevros and Zvorykin 1939; Bintliff 1977a: 609-614; Bintliff 1977b; Morris 1994; Morris et al forthcoming). Our inability to identify subtle changes in Crete's prehistoric climate (see below) means we cannot assess climatic effect on soil nutrient availability at times in the past. There is currently little chance for profile development in Cretan soils, due to the aridity of the summers; this limitation seems to have applied through much of the Holocene (Bintliff 1977a: 87; Bonnefont 1972: 70; although see Morris 1994, discussed below). No humus layer is currently formed, and little downward movement of soil nutrients takes place. Instead, nutrients are concentrated in the form of evaporates close to the surface.

Weathering and erosion of rocks on Crete's steep gradients, and transportation of the products to lower-lying areas within a relatively short distance, means that soils have strong visual and chemical links to their parent material, and are often visible in the process of being formed. A recent set of soil analyses /geomorphological studies carried out around the EIA site at Karfi is highly relevant to the subject of my study (Morris 1994). Soil coring at selected locations around the site showed LM IIIC sherds stratified just above a buried soil, whose upper layers had been truncated. This finding, together with the fact that the area has been uncultivated through much of the historical period, suggested cultivation here in the EIA

period. Morris even suggests that the terraces in which this soil was found can be dated to LM IIIC, although this is not clearly shown stratigraphically (Morris 1994: 63). An argillic horizon in the buried soil indicated its formation under rather wetter conditions than today's, probably occurring from the early Holocene. Another buried soil, of probably similar date, was found in a sinkhole on the Nissimo plain. A disturbed Roman land surface lay some way above it, indicating significant amounts of deposition here between EIA and Roman.

Substantial deposits of post-EIA colluvium found at various locations on the eastern slopes of Karfi might relate to the abandonment of cultivation in the area after this time. But the study indicated great variation in the depth of deposit on different parts of the slopes. While in some areas soil depth had increased as material eroded downwards, in others, e.g. on the top of Karfi, Morris suggested that the soil surface level was the same in LM IIIC as at present.. Still, overall, it is possible to reconstruct more soil on the higher hillslopes in the LBA/EIA than today. Substantial post-EIA deposits on the Kavousi plain might also be partly related to reduced cultivation on the higher slopes by the later EIA. But modern studies show that various ecological factors affect soil retention on slopes after the retreat of cultivation, making simple cause and effect models of soil movement unreliable.

We clearly cannot assume parity between the soils around EIA sites today and in the past. But given their close relationship to underlying geology, the general chemical characteristics and physical extent of soil types in an area today are likely to have some similarities to those of their EIA predecessors (although changing climatic conditions have continuously affected their productive capability).

### *Ecology and climate*

Vegetation and climate history is intrinsically linked with soil character and geomorphological change. Notions of extensive deforestation since antiquity causing catastrophic, irreversible erosion and the degrading of vegetation cover, are now largely exploded for Crete and other parts of the Aegean/east Mediterranean (Rackham 1973; 1982; 1983; 1990; 1992; 1996).

Long-term resilience of the landscape has been observed in terms of potential for regeneration of various types of climax cover. Man's role in ecological change occurring over time has been assessed in much more detail. Rackham asks:

'Do trees, and only trees, protect soils from erosion? It may well be true in other parts of the world, with different combinations of soil, climate, and trees. In Greece I can find little evidence that it is true...Most of Greece is not very erodible.....vegetation can have some effect (in preventing erosion) in the form not of trees but of low-growing crusts of mosses and lichens which hold the surface together against the assaults of running water and even rolling

stones. In most of Greece trees have, at best, only a slight influence. Instead a whole range of human actions (including grazing as well as cutting and burning) and ecological transformations seem to affect both land cover and erosion.' (Rackham 1996: 31).

The range of wild and cultivated plant species indicates a broadly Mediterranean environment for Crete from at least the Early Bronze Age until the present day. Subtle climatic variations are difficult to reconstruct without detailed evidence, although work on the Little Ice Age, for example, notes the likely ecological effects of fairly short-term climate change in the past (Grove 1992; Moody forthcoming). Fossil pollen from the island is very rare (resulting from a lack of waterlogged environments) and the few cores obtained have not helped in land cover reconstruction for the EIA (Bottema 1980; Hall et al 1992; Rackham and Moody 1996: 123-6; Moody, Rackham and Rapp 1996). A core from Ayia Galini, on the south coast of west Crete, shows that pine forest was gradually replaced by deciduous oak, with patches of open grassland, during the early Holocene. This development was probably linked to an increasingly moist climate, with relatively few Mediterranean elements (Bottema 1980). A variety of microenvironments must have existed in this natural 'mosaic' of vegetation (Turland, Chilton and Press 1993: 4). The finding that blanket forest cover does not characterise the early Holocene here may well apply to much of the rest of Crete (Rackham 1992: 35).

Climate after the 'oak event' at Ayia Galini seems to have become progressively drier. A core from Tersana in NW Crete shows a rise in olive, though not in other moisture-favouring species, from the Neolithic.<sup>2</sup> It also shows an increase in species favouring open areas, supporting the idea that fairly large-scale clearance for cultivation had taken place by this period (Moody 1987: 81-93; Moody, Rackham and Rapp 1996). Cultivation and/or grazing on cleared areas from the Neolithic would prevent or severely restrict the regeneration of climax cover, but changes in subsistence practices over time could allow any area to fall periodically out of use and regeneration to occur. Such local developments cannot be reconstructed in detail without more pollen data. A core from Kallikrati/Asi Gonia in west Crete, covering the early Byzantine period through to the present day, indicates several advances and retreats of woodland through the early Byzantine and Arab periods, and a more dramatic retreat near the end of the late Byzantine, which may be attributable to human activity (Hall et al 1992). Post-cultivation regeneration need not always have been trees, even if they had been the previous cover on the site. The character of regeneration today can be seen to vary greatly according to micro-climatic variations, soil composition and the nature of the land use

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<sup>2</sup> On this basis, the argument has been made that olive cultivation begins from the Neolithic in this area (Moody 1987: 81-93).



preceding abandonment. A study of modern Mediterranean environments showed grassland, rather than maquis, regeneration in open deep-soiled areas when grazing ceased: maquis regenerated best on rocky, steep areas (Blumler 1997). A grazing enclosure study on Chios showed similar results, with a decrease in shrubby vegetation and significant increase in herbaceous plants (Koutsidou and Margaritis 1992). On the other hand, rapid wood/maquis regeneration has been shown by Rackham to occur on various kinds of land in Crete after the abandonment of cultivation and in the absence of grazing (Rackham 1990; 1992). Bintliff's study of land potential in the Ayiofarango pointed up the resilience of the landscape and the falsity of assuming permanent degradation through long-term use by man.<sup>3</sup> He commented that: 'A first visit to the Ayiofarango valley, with its deserted and scrub-covered slopes, its thin dry soils and dead river, overwhelms one with the feeling that things must have been better when the Minoans and Romans sat densely upon the land, and that accumulated misuse has ultimately forced man to pull out his destructive presence. After several weeks' patient analysis of the potential fertility of the valley, what it offers now is as great if not greater than it gave to these earlier settlers.' (Bintliff 1977a: 614).

Lack of more detailed data on climate change and ecology in Crete limits our understanding of exactly how man has adapted to or transformed the environment in different periods. We may enhance this by focusing on the relationship of wider socioeconomic systems with subsistence practices and environment in the past, using both archaeological data and textual sources. Concerning man as an agent of geomorphological change, we must look further into the effect of specific agricultural practices, rather than assuming that land clearance alone has been enough to produce major erosive events. For example, it has been argued that is only when man uses regular vegetation burning as part of grazing regimes that progressive degradation ensues (Papanastasis et al 1992). A combination of land falling out of cultivation and unchecked sheep/goat roaming and grazing has been suggested as the decisive factor in large-scale erosion in the Classical-Hellenistic Argolid (van Andel et al 1986: 118-20). A single model is unlikely to apply.

The constituents of broadly typical present-day vegetation communities in Crete, as observed in my field studies, are presented below in very rough outline. The fieldwork recorded many variants on these groupings. The history of land-use had affected both the composition and extent of each actual community. Regional differences in microclimate, soils, and

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<sup>3</sup> He cites Pareyn and van Effenterre 1963, who argue (with very little supporting evidence) that presently grazed and eroding landscapes on the hills around Malia have had the same character since Minoan times.



geomorphology also affected composition. Detailed descriptions of vegetation communities in Crete and comments on man's role in creating them are provided by Polunin and Huxley 1970: 9-14; Sfikas 1987; Turland, Chilton and Press 1993; Hayden et al 1992: 311; Watrous et al 1993: 204-14; Rackham and Moody 1996: 53-73.

**Table 1.4-1**

*Vegetation communities encountered in the regions of Crete covered by this study - main species only.* (NB these do not represent any single observed community, but are composite groupings. The species are not in order of frequency of appearance)

Garigue vegetation	Thistle ( <i>Onopordum acanthium</i> , <i>Galactites tomentosa</i> and others), sage ( <i>Salvia triloba</i> ), myrtle ( <i>Myrtus communis</i> ), thorny burnet ( <i>Poterium spinosum</i> ), lentisk ( <i>Pistacia lentiscus</i> ), juniper ( <i>Juniperus phoenicea</i> ), thyme ( <i>Thymus vulgaris</i> ) mullein ( <i>Verbascum undulatum</i> ), <i>Thymelaea tartonaria</i> , <i>Euphorbia acanthothamnus</i>
Low-medium maquis	Broom ( <i>Genista acanthoclados</i> , <i>Calcitome infesta</i> , <i>Spartium junceum</i> ), lentisk, juniper, terebinth ( <i>Pistacia terebinthus</i> ), holm oak ( <i>Quercus ilex</i> ), prickly oak ( <i>Quercus coccifera</i> ), <i>Quercus brachyphylla</i> , <i>Quercus macrolepis</i> , <i>Arbutus unedo</i> , <i>phyllyrea media</i>
High maquis/woodland	Excultivated or wild olive ( <i>Olea europaea</i> , var. <i>oleaster</i> ), carob ( <i>Ceratonia siliqua</i> ), almond ( <i>Prunus amygdalus</i> ), wild pear ( <i>Pyrus communis</i> ), pine ( <i>Pinus brutia</i> ) prickly oak ( <i>Quercus coccifera</i> ), holm oak ( <i>Quercus ilex</i> ) cypress ( <i>Cupressus sempervirens</i> ), myrtle, <i>Phlomis fruticosa</i>
Gorge vegetation (seasonal or year-round watercourses)	Sycamore ( <i>Acer monspessulanum</i> ), chaste tree ( <i>Agnex vitus-castus</i> ) oleander ( <i>Nerium oleander</i> ), ivy ( <i>Hedera helix</i> ), plane ( <i>Platanus orientalis</i> ), holm and prickly oak, wild olive, wild pear, fig ( <i>Ficus carica</i> ), willow ( <i>Salix alba</i> L.), bramble ( <i>Rubus ulmifolius</i> ), giant reed ( <i>Arundo donax</i> ), prickly pear ( <i>Opuntia ficus indica</i> )
Excultivated meadow/steppe	Grasses - <i>Graminae</i> sp. ( <i>Bromus</i> , <i>Aegilops</i> , <i>Hordeum</i> , <i>Avena</i> ). <i>Compositae</i> sp., Legumes - <i>Leguminosae</i> sp., Clovers - <i>Cruciferae</i> sp., Vetches - <i>Lathyrus</i> sp., asphodel ( <i>Asphodelus aestivus</i> , <i>asphodelus fistulosus</i> ), broom, poppy ( <i>Papaver rhoea</i> ), squirting cucumber ( <i>Ecballium elaterium</i> ), sea squill ( <i>Urginea maritima</i> ), <i>Thymelaea hirsuta</i> , <i>Hyparrhenia hirta</i> , bindweed ( <i>Convolvulus arvensis</i> ), thistle,
List of field, garden and hothouse crops (various sub-species; species names not listed)	Oats, barley, wheat, vine, lentil, chickpea, pea, bean, potato, tomato, citrus (orange, lemon, grapefruit), cucumber, melon, watermelon, avocado
List of cultivated trees	Olive, almond ( <i>Prunus communis</i> ), carob, cypress, pear, citrus, almonds, walnut ( <i>Juglans regia</i> ), cherry ( <i>Prunus dulcis</i> ), apple ( <i>Malus communis</i> ), plum ( <i>Prunus domestica</i> ), apricot ( <i>Prunus armeniaca</i> ), peach ( <i>Prunus persica</i> ), pomegranate ( <i>Punica granatum</i> ), chestnut ( <i>Castanea sativa</i> )

Notes:

- 'Phrygana' - a heavily-grazed garigue composed of predominantly thorny or spiny evergreen plants resistant to grazing, interspersed with herbs and grasses - is common outwith the intensively cultivated areas, which are usually located on valley floors or plains. This low vegetation gives an impression of 'barrenness' in these areas. We shall see later how often garigue is distributed with regard to a history of past clearance and/or cultivation, followed by intensive grazing continuing at the present day. The maquis communities described have more or less of particular species depending, among other factors, on the extent of grazing.
- A distinctive, dense, vegetation community of varying average height and species diversity (depending on the amount of available water) appears in shady gorges and along stream/river beds and banks.
- Vines and (since the 1970s) hothouse crops are the main cash species beside olive. Important food species now cultivated which have been introduced since the Iron Age include tomatoes, citrus, and potatoes. Cereals and legumes now cover a very small part of the cultivated land.
- Irrigated olives (of various ages) are by far the dominant cultivar throughout the island's agricultural areas, and new areas are regularly planted out with trees. Under current climatic conditions the olive rarely grows above c. 700m in Crete. Hard fruits, walnuts, almonds and carobs are gathered from semi-wild trees or groups maintained in small numbers. Stretches of forest of cypress, oak and pine, of varying density, extend over large areas, particularly in parts of the mountain ranges and their foothills.

*Plant and animal species exploited in LBA-EIA Crete and the Aegean - faunal and archaeobotanical evidence<sup>4</sup>*

I turn now to published botanical and faunal assemblages from the EIA. These have recently been supplemented by organic residue analyses carried out on ceramics from a selection of LBA/EIA sites (Tzedakis et al 1999).

The perpetuated use as significant subsistence crops of species like vine, olive and fig from the LBA into EIA-C confirms a broadly Mediterranean climate through this whole period (Isager and Skydsgaard 1992: 11). Cereals (predominantly barley, emmer and einkorn) appear in the archaeobotanical record at a number of LBA sites in Crete, indicating a considerable significance in the diet (see below). Bread wheat (*Triticum aestivum*) appears in a pure deposit

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<sup>4</sup> A significant amount of archaeobotanical and faunal material from EIA contexts at Kommos has very recently been published, supplementing the material discussed below (Shaw and Shaw 2000). Unfortunately I had no opportunity to see this volume before completing the present work.

from LM II Knossos, suggesting it was a specialised crop: although it would have demanded higher-nutrient soils than some of the other cereals, these conditions could have been obtained through crop rotation (Jones 1994; Hansen 1988: 43). Lentil, pea, chickpea, field bean and bitter vetch appear in the Aegean from the Late Neolithic, and were certainly used in LBA Crete, where they are found in varying proportions in the archaeobotanical record (Sarpaki 1992). Sarpaki and Jones suggest that cultivated *Lathyrus clymenum* (Spanish vetchling) may also have been regularly used for human consumption in LBA Crete (Sarpaki and Jones 1990). The importance of vine and olive in the diet, and their scale of production, are difficult to gauge exactly for the LBA. Substantial increases in representation of olive by the Late Bronze Age seem to point clearly to extensive cultivation by then at the very latest (*contra* Runnels and Hansen 1988; Hansen 1998: 46). Blitzer has pointed convincingly to material cultural evidence for olive processing on a significant scale by the LBA (Blitzer 1993a). Recently, Sarpaki has suggested that large quantities of crushed olives and residues of oil used as fuel indicate large-scale olive cultivation (for fuel as well as for food) by MM II (Sarpaki 1999). While there was certainly nothing like today's monoculture of irrigated olives, these observations, along with recent residue analyses (e.g. Tzedakis et al 1999: 115-6; 170, recording numerous instances of olive oil found on LM IIIB and IIIB/C cooking pots) indicate that olive was a significant food item and cultivated on a substantial scale. That wine was a very common beverage in LM III Crete is also demonstrated by residue analysis, and together with widespread archaeobotanical evidence for grapes, shows vine as a significant cultivar in the period (Tzedakis et al 1999: 170). Halstead and Sarpaki give the following lists of species retrieved from archaeobotanical material at LM III sites (see also Jones 1994).

**Table 1.4-2 Archaeobotanical remains from LBA Cretan sites, after Halstead 1992: 108; Sarpaki 1992: 166; Jones 1994 (species designations reproduced as originally published)**

Provenance	Cereals	Other	Pulses
<b>Kastelli Chania (LM III)</b>	Einkorn ( <i>Triticum monococcum</i> ), Emmer ( <i>Triticum dicoccum</i> ), Barley ( <i>Hordeum vulgare</i> )	Olive ( <i>Olea europaea</i> L.), Grape ( <i>Vitis vinifera</i> )	Pea ( <i>Pisum</i> sp.), Bitter vetch ( <i>Vicia ervilia</i> ), Field bean ( <i>Vicia faba</i> ), Lentil ( <i>Lens esculenta</i> ), Grass pea ( <i>Lathyrus sativus</i> )
<b>Phaistos (LM III)</b>	Barley	Olive, Vine	
Kamilari tomb	Emmer	Olive	
<b>Ayia Triadha villa, magazine 5</b>	Wheat		Lentil
Room 39			Chickpea ( <i>Cicer arietinum</i> ), Pea
Ayia Triadha house	Wheat		Grass pea
<b>Gournia town</b>			Pea
<b>Knossos palace, magazine 3</b>	?Barley		Pea, Bean
Knossos LM III	<i>Triticum</i> sp. Bread wheat ( <i>Triticum aestivum</i> ); <i>Hordeum vulgare</i>	<i>Olea europaea</i> L.	
W. Temple Repository	Grain?		
Lapidary's workshop	Wheat		Bean
Caravanserai (LM III)	Barley <i>Vitis vinifera</i>		<i>Vicia</i> sp./ <i>Lathyrus</i> sp., Grass pea, Bitter vetch, Field bean, Lentil

Unexplored Mansion	Bread wheat, einkorn, emmer, hulled barley	Fig	Grass pea, Bitter vetch, Field bean, <i>Vicia/Lathyrus sp.</i> incl. Spanish vetchling ( <i>Lathyrus clymenum</i> )
Malia palace, E. magazines	Wheat		Lentil
Room V			Lentil
Room XXV			Chickpea
Nirou Chani			Field bean, Bitter vetch
Palaikastro town, Room 23	?Bread wheat		Pea, Wild pea
Room 38			Pea
?	Barley		

The continued use in the EIA of the main food crops listed above can be seen from limited archaeobotanical data for this period (although more should soon be published and will be very welcome). Vine, wheat and barley, and olive are all reported from preliminary examination of assemblages at the Kavousi and Monastiraki Chalasmeno sites (Flint-Hamilton pers comm). No carbonised plant material has been separately published from LM IIIC levels at Kastelli Chania, and the excavators of Thronos Kefala have not published any plant material from the pits found there, which are rich in animal bones (Hallager and Hallager 2000; d'Agata forthcoming a). The evidence for olive and vine production in Archaic to Classical Crete is discussed in the next chapter. In conjunction with the LBA evidence discussed above, it supports the notion that these crops were significant throughout the LM IIIC-G period.

We are rather better informed about animal than plant resources from the EIA record, although published LBA bone assemblages from Crete are lacking for comparison. The profile of the LM II assemblage from the Unexplored Mansion at Knossos shows the dominance of ovicaprids, followed by pig and cattle. It seems that sheep and goat continued to be an important form of livestock in LM IIIC. The Kavousi Kastro assemblage as published to date spans the whole period LM IIIC-G, but a breakdown by period will shortly be published (Snyder and Klippel 1999)<sup>5</sup>. The Vronda assemblage has been quantified separately. At both

<sup>5</sup> Snyder and Klippel 2000: 68 give a breakdown of the contexts from which bone counts were done and their date. Most are LM IIIC-PG (1 out of 17 is LG, 1 is PG only). Snyder (pers comm) informed me that species percentages for individual periods represented in the Kavousi stratigraphy have been



Kavousi sites, and at LM IIIC Monastiraki Chalasmeno, Chania Kastelli, and Chamalevri, ovicaprids were by far the dominant species (Klippel and Snyder 1991; Snyder and Klippel 1994; Snyder and Klippel 1999; Mylona 1999, pers comm; Hallager and Hallager 2000: 193). At Kavousi and Chamalevri, ovicaprid age and sex structure suggests exploitation for meat and milk, rather than wool cropping (Klippel and Snyder 1991: 184-5; Mylona pers comm). Pigs are the second most common species in all published assemblages except that from Kavousi Kastro. Cattle were a significant stock animal, best-represented at Chania - a fact which the flat fertile landscape there helps explain - and at Kavousi Kastro, where the topography does not seem the most obviously suited to this species. They must have been used in ploughing (as attested by Linear B texts) as well as for meat (butchering marks are widely seen). Equids (evidenced in all the published assemblages) must have been important for transport. Deer is found in all the assemblages, and is particularly important at Chamalevri (where it is almost equivalent in proportion to pig), suggesting that hunting formed part of subsistence activity and that wooded environments must have existed as a habitat at least in this area. Older excavations at EIA sites produced unquantified bone assemblages which can only be used to confirm the existence of these main species: cattle bones appear in tombs at Vrokastro, for example (Hall 1914: 140). The settlement at Karfi produced bones of ovicaprid, cattle, pig, and red deer with other wild species (Pendlebury et al 1938). Although the scale and context of exploitation, particularly of sheep and goat, may have changed substantially between LM IIIA-B and the EIA - a question which will be dealt with below - we see from the data discussed above and summarised in the table below that the environmental conditions necessary to support these animals, and their use within a broad-based stock-raising regime, continued throughout the period.

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calculated, but that major changes in species proportions over time are not apparent.

Table 1.4-3 Faunal remains from EIA sites - proportions of main species (percentages)<sup>6</sup>

Site/date	<i>Ovis/capra</i> (%)	<i>Sus</i> (%)	<i>Bos</i> (%)	Others (list) Percentages included where known
Kavousi Kastro (mostly LM IIIC-PG)	82.2	7.7	8.6	Horse ( <i>Equus</i> ) (< 1%), fallow deer ( <i>Dama dama</i> ) (< 1%), agrimi ( <i>Caprus aegagrus</i> ) (< 0.1%), dog ( <i>Canis familiaris</i> ), small quantities of hare ( <i>Lepus sp.</i> ), badger ( <i>Melas melas</i> ) <sup>7</sup> and other small wild species; shellfish.
Kavousi Vronda LM IIIC	70	15.9	5	<i>Equus</i> (1%), <i>Caprus aegagrus</i> , <i>Canis</i> , <i>Lepus</i>
Monastiraki Chalasmeno LM IIIC <sup>8</sup>	72.9	16.7	5.2	<i>Equus</i> (2.1%), <i>Canis</i>
Chamalevri LM IIIC	41.3	15	7.4	Indeterminate medium mammals (15.7%), indeterminate large mammals (3.6%), <i>Equus</i> (1.3 %), <i>Dama</i> (1.4%), <i>Cervus elaphus</i> (red deer) (1.3%), indeterminate deer (9.1%), wild <i>Sus scrofa</i> , <i>Bos primigenius</i> , <i>Canis</i> , <i>Lepus</i> , <i>Melas</i>
Chania LM IIIC	56	26	9	<i>Equus</i> , <i>Dama</i> , <i>Cervus</i> (all percentages unspecified)

<sup>6</sup> The statistics here are from assemblages of various sizes, and analyses are published with different levels of supporting detail. The Kastro one is the best published to date, and includes separate totals for screen- and hand-sorted bones. The analysed Chalasmeno assemblage is very small. The as yet mostly unpublished Chamalevri data are given here by kind permission of D. Mylona, who will publish the material in full. Most of the material from this site comes from pits, the nature of use of

### *Conclusions*

The discussion in this chapter has shown how difficult it is to separate the natural environment of Crete from human modifications of it, and the potentially long-term effects of such modifications. Indeed, in the last section I have already fully entered the discussion of details of subsistence practices and species preferences, which must have related to wider social and economic systems as well as to environment. These systems seem likely to have undergone various changes between the LBA and EIA and during the course of the EIA. The next chapter tries to illustrate how the social and economic framework of subsistence practice has changed in Crete from the LBA through to the present day. For the EIA period, this relationship will be addressed in much greater detail, and through the use of a range of evidence types, in the rest of the study.

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which is not fully clear. The dating of contexts for all the faunal data material referred to from Chamalevri is wholly within LM IIIC.

<sup>7</sup> May have been used as a food species (Snyder and Klippel 1996).

<sup>8</sup> Statistics from a very small sample of identified bone. 83% of bone fragments found were unidentified.

## Chapter 1.5

### Past and present frameworks of land use in Crete - a long-term perspective

Discussion in this chapter is based on historical and ethnographic data: the kind of information on past land use and settlement pattern provided by surviving material remains in the landscape is also discussed. Understanding of the changing wider context of land use in Crete in the periods for which texts are available is an essential base from which to assess potential subsistence strategies, and the constraints on them, in the EIA. Reference to a long timescale discourages the over-enthusiastic adoption of any single historical analogy for EIA subsistence frameworks. It emerges from the discussion that macro-level sociopolitical and economic factors have regularly been of the highest importance in affecting both land use and settlement in Crete. In contrast, changes or preferences in subsistence or settlement in response to environmental conditions alone are not very marked in post-LBA history. A broad agricultural base seems to have been the background to all the changing production emphases in Crete's history; and the island has had, through most if not all historical periods,<sup>1</sup> the inherent potential to feed its population (Moody 1992: 53).

I attempt here to avoid writing a sketchy and inadequate economic history - although a full economic history is still needed for Crete - and to focus on illustrating the main point noted above. A secondary function of this chapter is as a source for references and assumptions made in my fieldwork (Part 2). Some specific issues relevant to EIA subsistence and settlement which textual information can illuminate are addressed in detail.

#### *Structure of land-use in Crete from the LBA to the 19th century*

An understanding of the island's economic organisation in the LM IIIA-B period is particularly important for the purposes of the study, particularly since the Linear B texts from Knossos document some aspects of the prevailing large-scale economic system. They can be taken to refer generally to the period LM II/III A:1 to the end of LM IIIB, despite continued uncertainties about their exact dating (Killen 1968; 1985; Palaima 1989; 1992; Palmer 1992;

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<sup>1</sup> The effects of the Little Ice Age (15th - 17th centuries AD) on subsistence systems need more research: although difficulties must have been encountered, the area of exploitable land on Crete was certainly still large enough to sustain the population. As in other periods, much depended on the extent *actually* cultivated and how it was cultivated. (Grove 1992; Rackham and Moody 1996: 39-42; Moody forthcoming).

Driessen 1992; Shelmerdine 1992; Godart 1997; Godart and Tzedakis 1997; Haskell 1997; Halstead 1999).

A basic model for the LBA economy is well-known (e.g. Halstead 1981a; 1992; 1996; 1999). The palaces (or the largest institutions within a palatial-type system continuing into LM IIIA-B, at Knossos and probably at Chania, referred to hereafter as 'palaces') controlled production of cereals, wool and olives, apparently focused on the prime arable areas where the major settlements were located. Specialisation in these products seems likely, from the fact that they are the focus of existing texts. Despite archaeobotanical evidence for consumption of additional crops, including pulses and figs, these do not appear to be mentioned in the texts (Halstead 1992). These foodstuffs may have arrived in the form of taxes or tribute from smaller producers (whose lands were more limited in extent and/or located in marginal zones, Halstead suggests) or simply not have been mentioned in official records because of their peripheral role in the economy. Another less visible part of the system seems to have been the restocking of palatial flocks using animals from smaller-scale owners (Halstead 1999). I return below to the roles played by different social groups in the centralised LBA economic organisation.

The palace used capital-invested bulk products (wool and oil) to produce high-quality manufactured items (making use of a specialist, supported workforce). Dominance of these two areas of production was integral to political and economic control over large parts of the island, maintained through delegation of some of the production/processing work. The manufactured products were exported and entered circulation in the trans-Mediterranean system of long-distance trade (Killen 1964, 1985). By means of this trade the palace could accumulate other precious raw materials, such as metals, which could be fed into the manufacturing system and either re-exported, or consumed locally as prestige items.

The texts show that the administrative system at Knossos was dealing with at least 100 000 sheep in central Crete, and a total of 500 000 sheep has been estimated for the island as a whole in the period of the tablets, based on analogy with the 19th- to early 20th-century average number of animals (Killen 1964: 5; 1985: 283; Halstead 1996: 32).<sup>2</sup> It is likely that

<sup>2</sup> A medium-large sized herd in traditional/present-day Greece is 200-400 animals. 500 000 animals might represent up to 5000 herds. With a population of around 200 000 (the average historical figure; see Rackham and Moody 1996: 97-99) and with a maximum 5000 herds (assuming an average of 2 full-time shepherds per herd), only about 5% of Crete's inhabitants could ever have been fully supported by herding in the LBA (see Halstead 1996: 34, who suggests c.50+ animals per year would be needed to support one person on a specialised pastoralist regime). This puts the role of herding in the economy into perspective.

wool and textile processing involved a sizeable number of people within the complex economic system. 'Collector' references are personal names in the genitive associated with a quantified entity and a topographical name in a particular sequence (e.g. Bennet 1985, 1992; Driessen 1992). Sometimes another personal name, referred to by Bennet as a 'shepherd' name, also occurs in these sequences. The occurrences of shepherd/collector names are nearly always associated with flock records, or with records concerning wool-processing workshops and cloth manufacture, rather than other kinds of produce (Bennet 1992). A single 'collector' name (CN) sometimes has several flock holdings listed against it, apparently related to different regions of the island, and around 100 such names are recorded, suggesting the relative economic power held by this group of people. Bennet interprets the term *a-ko-ra*, appearing in some records with CNs, as representing direct ownership/exchange transactions in animals between the central authority and private/semi-private owners (while Godart, on the basis of the Pylos texts, suggests it refers to livestock being brought into the palace flocks from distant (but palace-controlled) breeding areas; Bennet 1992; Godart 1992). Some decentralised authority in the gathering and recording of herding and other products, as well as in control of production itself, seems likely to have been essential to the highly-organised economy (Olivier 1997; Halstead 1999). This is particularly likely given the dissected nature of Crete's topography. Small has recently suggested for the Greek mainland that outwith the palace-owned land areas, productive activity was controlled by independent lineages (Small 1998b). Elements of this model are worth bearing in mind when considering LBA at this period.

Settlement distribution was important to the complex economic system just described (Bennet 1985, 1992; Shelmerdine 1992). Archaeology shows the concentration of settlement on the most accessible and productive areas of arable land in the island (the Knossos, Chania, Mesara, Malia plains and other large fertile areas) - a pattern well-suited to an extensive, high-investment agricultural economy. A hierarchy of settlements, the main centres at Knossos and Chania and others functioning as regional sub-centres concerned with gathering, recording and redistributing produce, has been argued for, based on analysis of place-names in the texts together with the archaeological evidence (Bennet 1990).

Halstead has used observations on traditional farming in Greece to suggest parallel patterns in the LBA, with a) extensive areas of arable under crops and b) large-scale herding of sheep and goats involving movement over some distances (Halstead 1987). This pattern would need large areas of cleared land and relied on the existence of specialist workers, a large seasonal labour supply and the ability to feed work animals year-round, the latter being a substantial cost. Political stability, with the control of large areas of territory by strongly established authorities, is likely to have been crucial in maintaining the large-scale LBA



herding referred to by the texts (Cherry 1988: 25-28; Halstead 1996: 21). Large parts of the uplands must have been cleared and under grazing, together with fallow parts of the lower cultivated areas. Such large-scale operations would demand sustained capital investment from the palace institution(s). Physical complementarity in land-use may have operated either within palace-controlled lands, or between palatial and other territories - with bulk production of cereals/olives (perhaps with inter-grazing or stubble grazing) on the best land, and other forms of land use, such as extensive grazing, beekeeping and small-scale mixed agriculture, in areas not so amenable to extensive plough agriculture (Halstead 1996: 32). Sarpaki suggests both bare and green (legume) fallowing rotations would be common in the LBA; Halstead argues for only limited use of extensive bare fallowing (Sarpaki 1992; Halstead 1987: 81-2). Rotations would help to restore soil nutrients, control weeds and provide fodder, although as Halstead observes, neither form of fallowing could help much in retaining soil water from year to year.

I here leave aside the EIA, to which I will of course return later in detail. By the Classical period, the organisation of land-use in many parts of the Greek mainland was based around decentralised, privately-owned estates with bound labour, and the basis of this system must have prevailed in Crete well before the highly formalised references to it appear in the 5th-century Gortyn law code (the first significant textual source on economic organisation in post-BA Crete (Osborne 1987; Willetts 1967). The code includes rules on serf labour and on the relationship of heredity and residence to landholding (Willetts 1967; Willetts 1977: 216-244) The link between residence on, and private ownership of, land was strong enough to give serfs some use rights to land they had worked and lived on for long periods. The system of bound labour was to apply to Crete in various forms until the Byzantine period, apparently without major changes in its structure. The effects of the private estate system on subsistence practices appear to have been to support investment in fairly intensive, diverse land use, as indicated by evidence from Attica (Osborne 1987; Amouretti 1986, 1992). However, opportunities for extensification probably developed through the period. In Attica this was encouraged by the renting of land plots, often by absentee landlords; in Crete by Hellenistic times, complex reciprocal arrangements between communities about both grazing and agricultural land-use rights were common, also promoting larger units of land use. (Chaniotis 1999; Guizzi 1999). Olive cropping was seen as a high-investment activity in this period (cf. the mid-7th-century Dreros inscription in Crete referring to the ceremonial planting of olives to annex land, and Solon's early 6th century laws in Athens, prohibiting olives from being uprooted (Meiggs and Lewis 1989: 2-3; Plutarch *Life of Solon* 23, 70). The value of intensive practices in cultivating tree crops was well-understood (Osborne 1987; Amouretti 1986: 632; for vines, Hanson 1992). Works like those of Theophrastus and Hesiod show that legumes, as

well as cereals, were important in subsistence in Attica and probably elsewhere in the Greek world. The cycles of sowing reported in the ancient sources (collated by Amouretti) indicate knowledgeable and fairly intensive use of land, with a spring-sown crop sometimes used to extend its productive capability. Bare fallowing and manuring were in common use.

Subsistence in Crete was increasingly linked to the interregional economy, in which both state bodies and private elite groups had a (sometimes conflicting) interest (Small 1998a; Viviers 1999). By the Hellenistic period (and probably earlier), Crete was exporting significant amounts of wine and oil to the rest of the Aegean. This is reflected in the growth of harbour settlements, but inland *poleis* and dispersed rural settlements connected to agriculture remained important. It is unclear how intensively these exports were produced. The growing complexity of exchange systems may have meant that, as evidenced for Attica and other areas, bulk imports and exports of grain also occasionally took place (Garnsey and Morris 1989; Osborne 1987: 98-9). Common and private grazing over large tracts of land seems to have grown, as increasingly large and powerful *poleis* states were able to guarantee territorial boundaries or share territories by agreement: Chaniotis argues that this gave rise to a significant growth in large-scale specialised pastoralism by the Hellenistic period (Chaniotis 1999). He also points out the economic importance of roads as indicated by the Hellenistic treaties: the development of physical communications between different parts of the island could be extremely important in orientating the emphasis of production and exchange. The favourable context for cash cropping of wine, oil and wool and the use of grain imports suggest cereal cultivation may well have diminished during this period, perhaps causing staple shortages of a kind which were to recur periodically in Crete's history (see below).

After the Roman takeover of Crete, in 67 BC, the island became part of a large, complex and centrally-controlled economic system, although as Harrison notes, its produce was never economically crucial to the empire (Harrison 1998). It formed for most of the period a single province together with Cyrenaica in north Africa (whose grain exports *were* relied on by the empire), and also exported grain, although in much smaller quantities. Large-scale olive oil and wine exports continued throughout the Roman period (Harrison 1998: 130-1).

All regions saw the continued spread of small settlement outwith the *polis* centres, development of the settlement hierarchy, and the growth of coastal towns (Sanders 1982: 31; Harrison 1998: 132-3, following Hayden et al 1992). Gortyn became the main administrative centre. Sanders suggests a system of extensive estates with wealthy, sometimes absentee, landlords and serf labour is likely to have existed at least in the largest prime arable regions, such as the Mesara (Sanders 1982: 33; Harrison 1995:133). Investment in water management, including aqueduct and cistern construction, was facilitated by this kind of stable control (e.g.

Sanders 1982: 23; Harrison 1998: 130). Outwith the main agricultural areas, little or nothing is known of the system of land ownership and management. Remains of Roman farmsteads/villas usually tend to occupy valley land - we do not know how far agriculture extended onto the hillslopes, or the economic role of herding. Harrison suggests that there was not the same extent of use of second-class arable areas as in some other periods, when subsistence stress was greater (Harrison 1998: 130; see below). Maintenance of a prosperous subsistence balance, without great extensification of land use, was undoubtedly boosted by the economic security which membership of the empire provided.

The early Byzantine and Arab periods provide very little textual or archaeological information on economy and land use (Detorakis 1994: 109-119; although see Sanders 1982). From late Byzantine onwards, our information becomes much more detailed. In particular, 15th- to late 19th-century travellers from other parts of Europe provide information on land use practices and economic systems.<sup>3</sup> Administrative documents of various periods have been usefully collated and analysed by recent historians (Noiret 1892; Spanakis 1935, 1991; Stavrinidis 1984-7; Triandphyllidou-Baladié 1988; Gasparis 1997).

In the early Byzantine period, land was held in large estates (the state and the Church, as well as private landowners, all had landholdings of this type). The land was worked by bound tenants (*paroikoi*). Many elements of the Roman administrative pattern were perpetuated, with the main centre still at Gortyn (Detorakis 1994: 109-12; Gasparis 1997: 18-19). Despite the perpetuation of a feudal system, land ownership and profits from agriculture seem to have been more alienable and cash-orientated than in preceding periods, and new priorities came into play in connection with this. Landowners were able to take their profit share from the tenants directly in cash instead of in produce. In the 7th to 10th centuries, during the Arab occupation of Crete, there was a constant growth in smaller landholdings, as serfs who had bought their freedom were allowed to acquire land, and a consequent partial decentralisation of economic control (Gasparis 1997: 18-19). But from the 11th century much land was reconsolidated into large estates under the control of feudal lords (*archontes*). Many were military personnel instrumental involved in the recapture of Crete from the Arabs, offered landholdings as rewards (Detorakis 1994: 135-6). The state, in turn, reaped substantial rewards from these landowners in taxes, which were usually passed on to the peasants, making profitability from small-scale agriculture difficult. Demographic expansion throughout the

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<sup>3</sup> In using these sources, which range from private journals to statistical accounts of trade and tax documents, we must bear in mind their limitations, particularly the inherent prejudices of the authors and their selectivity in recording information (Warren 1972).

Byzantine empire by the 12th century, and extensification promoted by the changed landowning system, seem to have led to an overall increase in the area of cultivated land in Crete in this period.

The feudal system continued to operate throughout the Venetian period, but the land ownership system was again reconstructed, with the existing feudal lords being replaced in many cases by Venetian nobles or the Venetian state.<sup>4</sup> A related shift of interests in land use occurred which was based on a clearly targeted market - the merchant empire of Venice.

Large-scale pastoralism was most profitable to those able to make the initial investment in large numbers of animals and large tracts of pasture while spreading the labour costs - the landowning elite. It flourished (as in other areas of the medieval Mediterranean) under strong state control structures, with enforcement of territorial rules and opportunities for engagement with complex exchange systems, including a big export market (Lewthwaite 1981; Garnsey 1988). There were substantial exports of wool and cheese to Venice and other parts of the empire (Gasparis 1997: 113). Labour- and risk-sharing systems (*syntrofies*) were in operation which allowed the ownership of large herds of sheep and goats without overextension of investment. One system allowed the partner investing the capital assets - the animals - to get back a large proportion of the profits, while the labour costs were borne by the second partner. The economic importance of herding is shown by the fact that the state levied a tax on feudal lords to pay for public officials concerned with herd/pasture protection (Gasparis 1997: 115). The tax was passed on by landlords to tenants in tithes or rents. Some pasture areas at this time were used in common by the inhabitants of the villages in whose territory they were, on payment of a sum by each user to the feudal lords who actually owned the land. These users had mixed smallholdings, with herding only a minor part of their subsistence regime. Whole pasture blocks could also be rented.

Agriculture was invested in through numerous land improvements, as elsewhere in the Venetian empire (Braudel 1979: 66-81). Only the rich (landowners) could make these improvements, and were the main beneficiaries of them. They included the drainage of the Lasithi plain in the 15th century, a major project (Watrous 1982: 28-9). In 1417 Buondelmonti mentions diversion of the river into irrigation channels on the Chania plain; and there are examples of Venetian aqueducts in rural areas, e.g. in the Ayiofarango valley (van Spitael 1981: 135; Bintliff 1977a: 613; 622-4). Water for irrigation and milling was charged for in cash, as well as in produce, from the 13th century, as Gasparis shows (Gasparis 1997: 105-110).

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<sup>4</sup>Churches and monasteries also held substantial holdings in the Venetian period.

An emphasis on the vine as the main cash crop grew through this period, and Cretan wines went all over Europe. But gradual shortfall in wheat production, caused by fluctuations in prices as well as by the growing profitability of vine planting, had led to staple shortages by the 15th century. The problem was highlighted by the need for self-sufficiency in food in an atmosphere of political insecurity, particularly from the late 16th century (caused by Turkish challenges to Venetian power in the Mediterranean). A large number of Venetian troops stationed in the island, plus a growing local population, were swelling food needs. Earlier under Venetian rule, some fertile areas (mountain plains like Lasithi and the smaller Omalos, Anopolis and Eleutherna plains) had been left uncultivated for political reasons, since they had the potential to become rebel strongholds (van Spitael 1981: 104; Raulin 1868: 350).<sup>5</sup> In response to the food problems, such areas, together with other previously non-favoured areas for cereal agriculture, such as steep or rocky hillslopes, began to be put under cultivation for grain (as seen from a state order of 1463; see Noiret 1892: 488). Elsewhere, grazing was restricted to prevent damage to cereal crops. Alongside the planting of new areas in cereals, a strategy was applied of placing limits on vine cultivation and encouraging the sale of a fixed proportion of grain production to the state at set prices. An ordinance of 1584 ordered the uprooting of vines near modern Iraklion and the planting of cereals in their place (Garzoni 1586; Triandaphyllidou-Baladié 1988: 168-9). Another state strategy considered at this time was to award perpetual landholdings, rather than tenancies, in underproducing areas (Mocenigo 1589 (cited in Spanakis 1935:183-189). This shows recognition of the underdevelopment of the rural economy in the feudal system, and of the positive impact of land ownership and related investment on productivity. Mocenigo records cultivation for 'only 3-4 months of the year' in some areas which were under-used but had high fertility, explicitly associating this with conditions where feudal lords were exploiting the land mostly for cash.

By the late 16th century demand for wine exports was declining, and this further favoured a shift of emphasis in agriculture. Records of export production for the late 17th to early 18th centuries reflect the lasting results of the changes just described, showing a significant move away from large-scale viticulture and a continuing focus on cereal production (Triandaphyllidou-Baladié 1988). During the peak of the self-sufficiency policy, grain, by virtue of its ability to grow at up to c. 1500 m asl, was sown in places where other crops could not flourish; 'Production was located, as well as in mountainous areas...in abandoned/deserted

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<sup>5</sup>Raulin refers to a description from 1583 of the Lasithi plain as full of wild trees, and it being forbidden even to herd there, although Buondelmonti had described grazing in the area in the early 15th century.



land and in lands which were set aside for other crops but diverted/converted into grainfields to fulfil the needs of the population.' (Triandaphyllidou-Baladié 1988: 170). By the late 17th century, Crete was able not only to support itself in cereals but to export sizeable quantities of surplus, particularly to North Africa and the Aegean islands (Triandaphyllidou-Baladié 1988: 172).

After the Turkish takeover of the island, which coincided with a demographic decline, the fragmentation of large feudal estates through land redistribution meant that the investment and labour necessary for large-scale viticulture was much less available. Triandaphyllidou-Baladié argues that olive grew in popularity as a cash crop at this time for these reasons (Triandaphyllidou-Baladié 1988: 134).<sup>6</sup> It is true that the olive lends itself well to intercropping with grain on poor soils, and is in this way valuable to the small farmer. But the 18th-century growth in production of olives, as well as in other crops, like citrus, to a smaller extent, seems to relate most strongly to changing external demand: as Triandaphyllidou-Baladié demonstrates. Increased Mediterranean-wide demand for olive oil after several collapses of the olive crop in Provence was a major stimulus. At the same time, the perceived need for self-sufficiency in cereals declined for a combination of reasons, including the flourishing export trade and the reduction of military threat. Eventually, this meant that the island again had recurrent grain shortages of serious proportions (Tournefort 1718: 33; Triandaphyllidou-Baladié 1988: 172-184). Despite this, grain *exports* from Crete took place through the 18th century, illustrating the effect of participation in a complex interregional exchange system, rather than purely local considerations, on land use. Disincentives to investment in small-scale production of either cereals or tree crops continued to operate in the Turkish period. The authorities, in addition to imposing a head tax, demanded one-seventh of the produce or its value from each landholding in the island (Pococke 1739: 266).

Through the 19th century the total area of land under cultivation spread substantially, as Crete's economy became completely bound up in a complex trading system in the east Mediterranean. A range of subsidiary cash crops were cultivated alongside olive and vine. Their range and extent varied considerably by region and over time. Chestnuts and citrus were, and are still, concentrated in the wetter climate of west Crete (Pashley 1837 (II): 302). Tree crops like carobs, raisins, figs, and almonds were also produced in significant quantities for

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<sup>6</sup> However, olive also requires substantial investment, and is not necessarily a highly profitable cultivar at very small scales. Either grafting onto wild olives or digging in new roots requires a high amount of labour time (in the initial operation and in subsequent maintenance) and the first significant crop is not received until at least 10 years afterwards (see, for example, Hanson 1992).



export through the 18th and 19th centuries (Pococke 1745: 243). In contrast, other cash crops had relatively short lifespans in Crete's history - Lithgow in the 17th century recorded dates and sugar; Tournefort noted production of silk, ladanum gum, honey and wax for export (Lithgow 1632: 76-77; Tournefort 1718: 28; 56; 69; Pococke 1745: 243). Gum, honey and wax were still produced in the 19th century. Pashley records linseed and maize (Pashley 1837: (II): 302). *Valonia* acorns used in the tanning process were produced in Crete, as well as more intensively in the Cyclades, at this time (Spratt 1865: 172). Soap, as a by-product of oil, was manufactured for export (mostly in west Crete) from at least the 18th century (Pashley 1837: (II): 302; Triandaphyllidou-Baladié 1988: 139-40). Cheese and wool were regular exports throughout this period (Triandaphyllidou-Baladié 1988: 29). I will refer below in much more detail to subsistence frameworks and practices in the 19th to early 20th centuries.

*The late 19th to 20th centuries: use of historical records and ethnographic information*

The first half of the 20th century in Crete was still characterised by unmechanised land-use practices, and the engagement of a large proportion of the population in subsistence agriculture/herding. This late 19th- to early/mid 20th-century period is what I mean in the rest of this study when referring to 'traditional' practices or patterns or to the 'traditional' period (e.g. Haggis 1993: 134). We have a wealth of information for this period, and for the years between World War II and the present-day (which saw significant change in subsistence practices arising from large-scale economic shifts). Sources range from scientific studies of agriculture, botany and rural economy, to local history in locally-published periodicals, to ethnographic research carried out in conjunction with archaeological/sociological studies in Crete and elsewhere in the Aegean. See, among many others, Allbaugh 1953; Wagstaff and Augustson 1982; Herzfeld 1985; Halstead 1987; Halstead and Jones 1989; Whitelaw 1991; Koutsidou and Margaritis 1992; Turland, Chilton and Press 1993; Forbes 1992, 1996; Rackham and Moody 1996; Koster 1997, plus those cited below and throughout this work. The 20th century demonstrates in the clearest way possible how far macroeconomic change can affect the way subsistence practice is organised. The rise of tourism has drawn settlement and economy to the coasts and shifted many people into the service sector. Mechanisation (including high-tech irrigation strategies) has encouraged extensive cash cropping. Grants and subsidies since the 1980s have made possible many land improvements and have directed the use of land in particular ways. I shall further explore these changes and their variability on a regional basis in Crete in the case studies of Part 2. The most widespread recent developments in agricultural practice and their effect on landscape in Crete are outlined by Rackham 1992; Hayden et al 1992: 311-5; Turland, Chilton and Press 1993: 10-11; Blitzer 1993b; Rackham and Moody 1996.



Statistical data on unmechanised agriculture is valuable in providing records of yields of different crops in Crete under recent environmental conditions. These may then be compared with older data given in ancient/historical accounts and with modern data to give estimates for average yields in the Bronze/Iron Age. I have attempted to do this below (**Table 1.5-1-3**): the attached notes show how this method has been widely used by archaeological studies in the Aegean. The pitfalls of relying too heavily on historical or ethnographic analogy and assuming too much continuity between ancient and historical/traditional societies must be borne firmly in mind (Halstead 1987; Isager and Skydsgaard 1992; 6; Forbes 1992; Haggis 1993; 141; Fotiadis 1995). As we have seen above, and as Halstead shows, the importance of wider social and economic context in influencing historical/traditional subsistence practices means that it is never possible to extrapolate from them directly to ancient production (Halstead 1987: 76-77). Nevertheless, Halstead suggests that methods for investigating ancient Aegean economy should certainly include the building up of a richer ethnographic database, given the rapid disappearance of the last material and social vestiges of traditional subsistence patterns (Halstead 1987: 88). This is part of what my case studies try to do. Below, I examine some special issues of interest to this study which can be illuminated by reference to historical/ethnographic evidence.

#### *Woodland and wild land - extent and use over time*

Historical evidence shows that Crete was to some degree a timber producer and exporter from Classical to at least Venetian times. Rackham and Moody have pointed out the regular overemphasis of Strabo's reference to a wooded Crete (Rackham and Moody 1996: 128-9) and the likely restriction of timber harvesting in antiquity to particular areas of the island. They highlight Theophrastus' account of Crete, which describes cypress as the 'principal tree' on the island in the Classical period, and its harvesting in the White Mountains (parts of which are today well-wooded). On the Sfakia coast, Buondelmonti in the early 15th century noted 'innumerable cypresses' and their harvesting for export sale (van Spitael 1981: 104; 109; 135). Rackham and Moody quote a report to the Venetian Senate of 1414, referring to a diminishing of the cypress area in Sfakia through cutting for export. But after the Venetian period there is little evidence for large-scale timber export (Rackham and Moody 1996: 132).

Woods, maquis and garigue (in Crete mostly oak or pine woods) are known from Aegean ethnography and history to have been well-used for subsistence purposes, including for firewood, building materials, beekeeping and culinary herbs (Forbes 1996; Chaniotis 1999: 209-10). They have sometimes been either formally or informally treated as 'common' land. This was the case in parts of Crete until about thirty years ago, e.g. for the outer slopes of the northern Lasithi range (Selenas) in the 20th century (Nowicki pers comm), and is still true to a

lesser extent today, when snail and herb/wild plant food gathering on this type of land are allowed fairly free rein.

I have already discussed the evidence for the regenerative capability of the present-day Cretan landscape into maquis or other vegetation forms after the removal of grazing; the advance and retreat of tree cover is seen through historical data to relate strongly to wider economic context. For example, maquis/tree cover may well have existed in the deliberately uncultivated highland plains like Lasithi in Venetian times, in contrast to today's intensive cultivation (cf. Buondelmonti's observations in 1417; van Spitael 1981: 105). In other cases the long-term stability of tree cover seen from historical accounts may arise from non-desirability of the land for cultivation on the basis of soil or topography. Tournefort records mixed deciduous/evergreen woodland on the steep, rocky slopes around Males in the south Lasithi mountains (Tournefort 1718: 38). Spratt describes Males, more than a century later, as 'situated on the slopes of a well-wooded and wild basin of abrupt hills', and this area still has a dense woodland cover (Spratt 1865: 290). Local sequences of cultivation, abandonment and grazing were important in which land was tree-covered in the past, as they are today. However, as I have already discussed and as we shall see demonstrated in the case studies, these three types of human action have a complex relationship with the natural environment, and by no means does vegetation always grow back to a standard climax after intervention.

#### *Herding and its contextual correlates*

Although environment, particularly topography, has long affected the importance and character of herding in Crete, socioeconomic context has been responsible for many of its variations in form (Koster 1997; Chaniotis 1995, 1999). It was best able to flourish in periods when a complex and centralised political system was in operation, although even in such a context, other political factors (e.g. the insecurity of highland plains in the Venetian period) restricted its extent. Archaeological and documentary evidence of the Venetian to present-day periods shows that herding has tended to use work bases separate from the main settlement (comprising *mandres* - enclosures/folds, and *mitata* - seasonal shepherd huts for residence and milk/cheese processing), particularly in extensive zones of mountainous grazing like the White Mountains of Sfakia (Rackham and Moody 1996: 159-60). But these settlement-extension arrangements have varied substantially, depending on localised factors, and it has been clearly established that there is no single pattern of seasonal shepherding practice. Anoyia, in the north-eastern Psiloritis range, is a mountainous region long associated with specialised herding. But historically, even these shepherds integrated small scale agriculture into their livelihood. Spratt records cultivation around this village and at Kamarotis, in the same region, even on steep and

rocky slopes, with the use of terracing (Spratt 1865: 73). In other regions, too, e.g. around Kritsa and Tapes, settlement extensions relating to combined herding and cultivation on second-quality land can be seen which date from at least the 19th century (Chapter 2.2). The practice of stubble grazing, and the collection of straw and acorns as winter fodder, were regular parts of such integrated systems in the 18th and 19th centuries (Tounefort 1718; Spratt 1865: 76; 300). Nowadays, however, this kind of integration is more rarely seen. Specialised herding is a commercial activity and is fully mechanised, with herds of up to 500 animals and the use of large tracts of owned or rented grazing, supplemented by commercial fodder products.

Long-distance vertical or horizontal movement of herds on a seasonal basis has existed and still exists in Crete today, although it is not the dominant herding mode. Spratt records the coastal plain of Loutro in Sfakia as a winter grazing ground for the Anopolis area, and summer grazing on the mountains around other highland plains like Kampos, Madaros, Omalos and Lasithi from about April (Spratt 1865: 102; 157; 177-8; 254). Bintliff refers to shepherds bringing flocks from the Sfakia mountains down to the Mesara area for the winter; this plain is also used by shepherds from north central Crete (Bintliff 1977a: 630). Shepherds from Erganos (in the south-west Lasithi mountains) have still taken their flocks to Makriyalos on the south-east coast for winter grazing within the last 8-10 years. Koster notes that shepherds from the Sfakia, Anoyia, and Lasithi areas all still use seasonal grazing in the isthmus of Ierapetra (Koster 1997: 54). It is important to understand, however, that this practice has never been based on ecological differences in the zones of movement (as understood by the term 'transhumance'),<sup>7</sup> but mostly relates to availability of cheap land, dispersed landholdings acquired through marriage or inheritance portions, and the desire for efficiency in land use, so that where rocky or high slopes cannot provide enough fresh grazing for animals, they are moved on to more densely-vegetated areas at any time of the year (Forbes 1995: 327-9; Koster 1997: 153-4). Movement can be over any distance, depending on the local situation. In the area north of Chamaizi, studied here, for example, summer and winter grazing take place within the same coastal zone, mostly over a large rocky headland which it is not profitable to cultivate. No change of residence location is required for the (specialised, full-time) shepherd: the grazing zone is accessible within an hour from the permanent village. It is made up of contiguous blocks rented from several different landowners. The same system applies in parts of the Ayios Vasilios valley in western Crete, where seasonal movement over distance is not always the pattern - even for large herds. They move around between various rocky hillslopes bordering

<sup>7</sup> See especially Garnsey 1988, Chaniotis 1995 for clarification of this term.

the valley floor. Both the above cases are discussed in Part 2. Where modern vertical/long-range movements do take place, they do not always involve change of residence - the Erganos example described above illustrates this case. Mechanised transport means that the *mandra/mitato* complex is often a workplace and occasional residence rather than a regular seasonal habitation. Herding in Crete, with its dissected topography and sharp relief allowing small scale movement between areas of different cultivation/grazing value, clearly contrasts with practice in other parts of Greece, where groups like the Sarakatsani have engaged for centuries in long-distance vertical and horizontal movements between distinct ecological zones.

The main distinction in both modern and traditional grazing systems in Crete is between integrated grazing land (located in or near arable/cultivated areas, incorporating patches of 'waste' and fallow),<sup>8</sup> and extensive grazing-only areas, outside the present cultivated zone and including the high mountain slopes, but also lower rocky or steep slopes (Koster 1997: 141). The traditional and current criterion for giving land over to grazing has been that it is labour-intensive and underproductive to cultivate, due to gradient, rockiness and (sometimes) soil type. I have noted in the preceding discussion that perceptions of land worth cultivating have changed substantially over time in Crete; in conjunction with this the grazed area must have expanded and contracted periodically. But the high mountains above 1500m, where cleared, are likely to have been permanently favoured as grazing zones. In the modern period an overwhelming focus on two main profit activities - irrigated olive cultivation and herding - has caused a decrease in extent of the small-scale 'integrated' grazing areas, as olives spread onto land previously considered of poor quality. The main areas in use for grazing now tend to be extensive and continuous. There is little common herding in the sense of shared labour or land, although the use of some publicly-owned grazing land on an individual basis helps some small-scale stock-keeping to continue.

*Changing perceptions of land potential for agriculture; the context of continuity or abandonment of use*

Tournefort observed that 'Though Candia is a rich country, yet the best land in it is cultivated but by halves; nay, two-thirds of this kingdom is nothing but Mountains, bald, dry, unpleasant, cut steep down, and fitter for Goats than for human creatures.' (Tournefort 1718: 71). While extensive clearance and grazing had occurred by the early 18th century, producing the barren appearance he refers to, many of these steep slopes might have previously supported cultivation (e.g. at the peak of the spread of cultivation in the 17th century). Many such areas would have

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<sup>8</sup> See Forbes 1995.



already gone out of use for agriculture by the time of Tournefort's visit, with the general early 18th-century slackening-off in grain cultivation. Grazing and browsing could then have kept them under a low garigue. The same phenomenon of the abandonment to grazing of areas once planted with cereals, legumes or vines has affected the appearance of Crete's landscape again in the last 50-100 years, with retraction of the widespread cereal cultivation of the 19th century (Turland, Chilton and Press 1993: 12; Rackham 1996: 41). For example, at Veni in the Amari valley, west Crete, Spratt observed; 'The whole area of the flat summit of Veni, which is nearly a mile long, is cultivated...It belongs to the monastery of Arkadi, the monks of which have a metochi or farm upon the east face of the hill, about 100 feet below its summit.' (Spratt 1865: 105). Here, the decline of the extensive mode of agriculture associated with the monastery, as well as other usual changes associated with mechanisation, must be responsible for the fact that none of this large area is cultivated now.

In contrast to these changing landscapes, some areas of the island, usually the largest flat areas with deep, loose soils, have been under intensive cultivation for as far back as we can trace in the historical record. People have been reluctant to waste this land, which was always perceived as fertile. For example, in the southern Ierapetra isthmus Buondelmonti mentions the fertile character of the cultivated plain in the early 15th century (van Spitael 1981: 105). Tournefort notes the same area as having irrigated olives, while the surrounding slopes were wooded with pine (Tournefort 1718: 37). Around Episkopi (slightly further north in the Ierapetra isthmus) Spratt, too, describes a fertile landscape, including olive and fruit trees (Spratt 1865: 184). Boyd presents a more detailed picture:

'From Episkopi south the low land widens and, being watered by mountain streams, is richly productive of lemons, oranges, figs and mulberries, as well as of the commoner fruits and grains. This cheerful fertility continues until the neighborhood of Ierapetra is reached, a region as barren as the northern shore and far less interesting.' (Boyd 1904: 11).

These accounts show how the flat, fertile isthmus with its soft and easily-worked soils was permanently in use for a variety of cultivars from at least early Venetian times, although the intensity of exploitation varied. The whole of the isthmus is now dominated by olives, the modern cash crop *par excellence*, and irrigated by a sophisticated system of geological wells and reservoirs. But Boyd's comment on the Kavousi kampos, in the northern part of the Ierapetra isthmus, illustrates the risks inherent in dry farming in the Mediterranean zone - yields may vary dramatically from year to year. 'In seasons of abundant rain like 1903 it gives good yields of olives, carobs, grapes, and grain, but in dry years like 1901 it is parched and fruitless.' (Boyd 1904:10). Modern irrigation has evened out these swings to an considerable extent.



The Chania plain is another example of an area long perceived as highly fertile. It was described by Lithgow as supporting olives, with the intensity of cultivation in the area round Soudha Bay evocatively pictured by him:

‘when I entered the valley, I could not find a foot of ground unmanured, save a narrow passing way wherein I was, the olives, pomegranates, dates, figges, oranges, lemmons, and pomi del Adamo growing all through each other, and at the rootes of which trees grew wheate, malvasie, muscadine, leaticke wines, grenadiers, carrobiers, mellones, and all other sortes of fruites and hearbes the earth can yield to man.’ (Lithgow 1632: 76-77).

Tournefort, too, noticed the density of olive cultivation in the area, interspersed with other cultivation (Tournefort 1718: 18-19). In the mid-19th century Spratt recorded the area around the city as ‘its chief vegetable-garden’ due to its water sources and noted in his turn that ‘The plain of Khania...is almost wholly covered with olives’ (Spratt 1865: 149; 161). Raulin describes the plain as ‘forested’ with olives, but also incorporating large tracts of cereal cultivation (Raulin 1868: 80). The area is still dominated today by intensive olive (and citrus) cultivation.

The point emerging from these examples is that definitions of the best arable land and perceptions about the best way to exploit it have varied according to social and economic context and prevailing subsistence practices. This also emerges from the fieldwork carried out in Part 2 and from other ethnographic fieldwork in Crete (e.g. Blitzer 1993b). It is crucially important to remember for studies of ancient subsistence, since it warns us that land potential studies cannot reconstruct actual land use at any period.

#### *Patterns of settlement and settlement extension, land ownership and land use*

Halstead defined a basic opposition of two forms in Aegean historical/traditional settlement and land use (Halstead 1981b, 1987: 83-4; Halstead and Jones 1989: 49). One was a dispersed pattern, with small settlements intensively farming the land immediately around them. The contrasting pattern was of large nucleated settlement associated with extensive land-use. Halstead suggested a broad relationship of the former model to Neolithic, and the latter to LBA, settlement and land use patterns.

Important to the latter model are forms of settlement extension - fieldhouses, shelters and *mitata* - connected both with herding and agriculture. The relationship of traditional/historical settlement to herding is a subject frequently referred to by those interested in prehistoric settlement, and ‘traditional’-type herding practices in antiquity have sometimes been assumed in explaining site location (Chapter 1.1, 1.3). Such analogies often fail to take account of the effect of systemic context on herding’s character at different periods, discussed

above. The historical/traditional 'Ano-Kato' ('Upper-Lower') system incorporates a main, permanent, village base, with a camp-type seasonal base near the less accessible grazing area. One settlement need not in fact be at much higher altitude than another, since the location of grazing has always depended on other criteria than altitude, as I have already discussed. It follows that there is no clear rule that the lower village of a pair is the permanent settlement.<sup>9</sup> As I have mentioned, herding now often takes place from a single settlement. Only occasional nights are spent at bases in the grazing areas, or commuting takes place in the grazing season every day between the grazing/milking base and the settlement of residence - sometimes one of the main cities.

Property divisions are a way in which land use patterns in Crete have been heavily influenced by wider socioeconomic factors. They have strongly affected settlement's extension in the form of fieldhouses, *mitata* and so on. The long-lived feudal system consistently fragmented land ownership, since tenants could often gain ownership rights through residence. Successive conquering regimes redistributed land, while post-Turkish reallocation brought new areas of land into public use (Koster 1997: 151). The origins of the partible inheritance principle which has historically dominated landholding in Crete and elsewhere in the Aegean are unclear. It promotes diversity in cropping and may have part of its origin in attempts at risk-buffering (Bintliff 1977a: 635; Forbes 1989: 90-91; Halstead and Jones 1989: 50). But as Bintliff notes, the restriction it imposes on extensification has always been offset by social contracts, e.g. the designation of common/shared 'family' land, and the increasing opportunity in the cash economy for individuals to buy up contiguous plots. However, Koster observes that the proportion of grazing land in private, rather than common, ownership is higher in Crete than elsewhere in the Aegean today, perhaps because of the island's still-strong agricultural interests and limited size, producing more pressure on land (Koster 1997: 143).

Partible inheritance, the prevalence of block land renting, and broken topography in Crete mean that historically- and currently-exploited subsistence territories cannot be neatly plotted in relation to settlement. This is supported by evidence shown in the tables below. Studies on Melos in the 1960s (Wagstaff and Augustson 1982: 110) and on Crete itself in the 1940s (Allbaugh 1953) show that farmers have traditionally been prepared to make journeys of up to six hours to reach fields.<sup>10</sup> While the majority of farmers in the sample from Crete in

<sup>9</sup> Rackham and Moody cite the case of Kallikrati above Patsianos, west Crete, where the grazing-zone settlement is occupied for longest in the year and is seen as the 'main' village (Rackham and Moody 1996: 160).

<sup>10</sup> See also Bintliff (1977a), 635; Osborne 1987: 30-31, 38-39.

1948 owned some land within 10 minutes’ walk of their home (73%), a substantial percentage had their furthest plots between 1 and 2 hour’s walk away. Few had their furthest plots more than 2 hours away, but some had their furthest plot up to 6 hours away. These facts can be used as a guide when choosing a radius to consistently characterise the ‘immediate’ hinterland of prehistoric sites in Part 2. However, the use of seasonal dwellings or fieldhouses, common in the Cretan landscape, often reduced the necessity of regular journeys of this length in the past, and mechanised transport currently makes such distances much more easily manageable.

**Table 1.5-1 Farmers’ opinion on distance worth travelling to cultivate a plot of land, Melos 1974 (Wagstaff and Augustson 1982: 110)**

Time	Percentage thinking it worth travelling	Percentage travelling
< 30 minutes	27.1	17.5
30-60 minutes	15.2	10.3
1.5 hours	5.1	13.4
2 hours	3.4	24.8
2.5 hours	11.9	9.3
3 hours	6.8	10.3
> 3 hours	30.5	14.4

**Table 1.5-2 Walking distance of agricultural plots from farmer's place of residence, Crete 1948 (Allbaugh 1953: 539)**

Minutes	Furthest plot		Nearest plot	
	Number of farms	Percentage of all farms	Number of farms	Percentage of all farms
0-10	10	3	250	73
11-20	27	8	72	21
21-30	56	16	15	4
31-40	4	1	3	1
41-50	20	6	1	0.5
51-60	75	22	4	1
61-70	1	0.5	0	0
71-80	6	2	0	0
81-90	34	10	1	0.5
91-100	3	1	0	0
111-120	55	16	0	0
121-130	1	0	0	0
141-150	13	4	0	0
171-180	17	5	0	0
191-200	1	0.5	0	0
231-240	4	1	0	0
291-300	13	4	0	0
351-360	4	1	0	0
411-420	1	0.5	0	0
591-600	1	0.5	0	0

#### *Yields - estimations using data from traditional farming*

We can make use of ethnographic and historical information to provide a basic estimate of likely yields, under non-mechanised cultivation systems, of the main species known to have been cultivated on Bronze-Iron Age Crete. We must take into account, however, that both ancient agriculture and herding would involve a high degree of risk (buffered to very various extents by large-scale socioeconomic systems; see Halstead and O'Shea 1982: 96-7; Hansen

1988: 41): Allowances must thus be made for regularly low yields and the need for retention of a high proportion of the crop for seed, in the case of cereals. In observations on traditional subsistence agriculture in Melos, the proportion of grain reserved needed to be about 25% (Wagstaff and Augustson 1982: 124-5). For Classical Attica, Garnsey postulates an average requirement of 130 kg of seed grain for each hectare of land, based on quantitative inscriptions (Garnsey 1992). In 19th-century Crete cereal yields are indicated by Pashley as averaging 15-20 times over seed (Pashley 1837 (II): 162, discussing the Apokoronas plain, west Crete).

In the table below, estimates are shown of the amount of cereal crop needed to feed one adult for a year, *assuming maximum caloric requirements and minimal crop yields* to allow for the high-risk, low-technology nature of ancient subsistence. The basic data for yields of different crops per ha under traditional farming systems in Crete come from Allbaugh 1953 and are adjusted with reference to other ethnographic/historical sources for the mainland and islands. The calculations assume subsistence on one foodstuff alone and eating to fulfil caloric requirements rather for the host of other sociocultural reasons which complicate the way humans consume food. These assumptions are completely artificial<sup>11</sup>, but provide the safest estimate of the maximum land areas needed for subsistence. The figures given represent the area of sowing needed to support an adult individual, assuming 100% reliance on cultivated crops. Thus, given an inevitable use of animal resources, a substantial margin of error is allowed. The figures can be considered in conjunction with traditional/historical family plot sizes, although these have been affected over time by various social and political structures. Gasparis, using primary sources from the early Venetian period, discusses the average size of peasant landholdings (0.9 -1.8 ha in cereals (usually with additional areas under olives or vines) and the average yields obtained (Gasparis 1997: 213-227). For a holding of 1 *vodi* (c. 1.2 ha) he gives the average figure of 680 kg, with a seed-yield ratio of 1:4. Bintliff records average plot sizes of 3.2 ha in traditional Crete (Bintliff 1977a: 634). Further data sources and published calculations supporting the estimates given here are cited in the Notes below.

<sup>11</sup> Foxhall and Forbes 1982: 68-71 suggest that grain made up 70-75% of the diet in Classical Greece, but this must have varied socially, regionally and from year to year.

**Table 1.5-3 Statistics and estimates on yields and consumption based on Allbaugh's data on mostly traditional, i.e. unmechanised, farming in Crete<sup>12</sup>**

Crop	Normal yield kg/ha (20% subtracted for seed) <sup>13</sup>	Kilo-calories per ha	Kilo-calories per kg	Quantity needed per person per year if 100% reliance (30% reliance for oil)	Quantity needed per growing year if 100% reliance (kg) assuming alternate fallow years and two-year fruiting cycle for olive, + 20% seed	Ha needed per person per year if 100% reliance, assuming alternate fallow years and two-year fruiting cycle for olive
Wheat	604.2 (483.4)	895257	3136.8	291	582	1.2 ha per person
Barley	742.4 (593.9)	2436406	3281.8	270	540	0.91 ha per person
Legumes	666.8 (533.4)	2347450	3520.5	259	518	0.97 ha per person
Olives	483.1 (oil) = 140 trees	4225410	8746.5	31.3	62.6	0.1 ha per person

<sup>12</sup>Allbaugh 1953: 242-287; 97-136. Tables used are Table 9 (107); Table 11 (126); Table 45 (259); Table 47 (266); Table 48 (267); Table 50 (277); Table A88 (546); Table A89 (547). The assumption of 100% reliance on the different field crops is made initially in order to produce estimates for *maximum* land areas needed for subsistence cultivation. These can then be divided according to assumed proportions in the diet of the major foodstuffs. For the same reason, the lowest range of yields given by Allbaugh is selected as representative, with the accompanying calorie values per ha of each crop as given by him.

<sup>13</sup>Following Wagstaff and Augustson 1982: 125 (Table 10.22), and Allbaugh 1953: 539 (Table A82).



*Notes*

1. Estimates by Garnsey on average subsistence requirements and cereal yield per ha in antiquity are as follows: wheat is suggested as having a yield of 625 kg/ha, barley 770 kg/ha, with a seed/yield ratio of 1: 4 - 1: 6 these crops (Garnsey 1992: 149-50). He gives a figure of 175 kg of cereals per person per year for subsistence, which is close to Osborne's of 180 kg (Osborne 1987: 44-5). His estimates are based on an estimate of the land area cultivated in Classical Attica and the quantities recorded as tribute on contemporary inscriptions.
2. An estimate by Bintliff on average cereal yield per ha in traditional Crete is c. 807 kg per ha (derived from some of Allbaugh's higher figures for Cretan yields, rather than the lower ones, and apparently making too little allowance for the completely unmechanised nature of ancient farming, the needs of fallowing and seed retention).
3. A range of primary and secondary estimates on cereal yields and requirements from traditional and historical farming in the southern Aegean, ranging from 590-900 kg for yields per ha and 110-287 kg for individual requirements, are collated by Davis (1991: 166).
4. Whitelaw suggests that 1.5 ha of arable would have been necessary to support one individual, even in the early 20th century, and that average cereal yield per ha would have been c. 340 kg/ha (Whitelaw 1991: 432; 438). The closest correspondence to the figure we have arrived at above is the estimates recorded by Halstead and Jones from farmers on modern Carpathos using traditional methods (not always with bare fallowing). These are 1.2 ha of cereals to feed one person per year (Halstead and Jones 1989: 47). Assuming a roughly 70% : 30% balance of cereals and olive as major foodstuffs in the diet, a figure of about 0.94 ha per person per year is arrived at, slightly less if pulses formed a significant part of the diet.
5. Olives must be looked at in a slightly different way from cereals and legumes. Pashley noted that 150-200 trees are needed for 100 *mistata*, c. 625 kg (Pashley 1837 (I): 121). He suggested that an average family consumed 40 *mistata* (c. 250 kg) per year, with a mean of 15-20 *mistata*, the produce of about 30 trees. The average weekly oil consumption for a family is estimated at 4 *okes* minimum (5.12kg; Pashley 1837 (I): 148). Examination of the data for 20th-century Crete presented by Allbaugh 1953: 266 and by Bintliff 1977a: 634 suggests that c. 0.1 ha of olives per person should be allowed for where olive is a significant element in subsistence (up to 30% of caloric intake). Bintliff suggests 1 ha of olives as average for a 7-person family under traditional systems (Bintliff 1977a: 634).

The contribution of animal products to the subsistence base is difficult to assess in prehistory, and the potential role for herding at the EIA settlements will be discussed further below. However, on the basis of ethnography it is possible to calculate that an (almost) fully animal-based diet, such as that relied on by traditional specialised pastoralists, would require

223 small goats or 131 small sheep per year for a family of 6 - that is, about 22-38 animals per person per year (Dahl and Hjort 1976: 220). Halstead, citing Dahl and Hjort's study, estimates that a rather higher number of animals would be needed in an Aegean environment (about 50 animals per person), based on lower assumed yields (Halstead 1996: 34; 1991b: 314). He suggests a requirement for each sheep/goat of 1 ha of good grazing (e.g. cultivation fallow) (Halstead 1981a: 204). 500 000 ha is a large chunk of the island under grazing, if we accept Killen's reconstruction of 500 000 sheep for the LBA and Raulin's 1847 figure of 666 000 sheep/239 000 goats (Killen 1985: 283; Rackham and Moody 1996: 163). Once again, wider economic structures have changed yields in Crete - nutrient-enhanced dried food presently allows many more sheep and goats to use any land area. Some energy investment in livestock was always necessary to work the land for cultivation (although perhaps not as much as under the recent (extensive) traditional system (Halstead and Jones 1989).

#### *Material remains relating to past land use*

I introduce here a few common cultural features in the Cretan landscape which bear witness to past land use, though this can not always be directly read off or easily dated from them. Surviving examples of such features are gradually becoming fewer. They are regularly discussed by ethnoarchaeological studies (see references above under 'Late 19th to 20th centuries', particularly Whitelaw 1991). Only a brief outline of the main types of feature found is given here - the case studies in Part 2 provide numerous examples, whose local significance is discussed in more detail. Where they can be matched up with textual information, these kinds of feature are valuable in cross-checking actual past subsistence practice against historical constructions of it. However, circumstances usually mean that only a general picture of land-use practice in a specific area/period can be achieved.

Periods of targeted land improvement, referred to earlier, are reflected in the remains of Roman cisterns and aqueducts, and Venetian drainage ditches/built channels, wells, and cisterns. The character of regional economic infrastructure and level of investment in agricultural production from the Byzantine/Venetian periods onwards can also be partly assessed through the distribution of milling/processing installations (Rackham and Moody 1996: 175-6). For example, the distribution of olive presses in comparison to flour mills in the Venetian-Turkish Mesara shows the existence of a centralised structure for olive pressing, in contrast to very localised flour milling (Vallianou and Kokkori 1987; Watrous et al 1993; Gasparis 1997: 97-105), as well as the relatively high importance of both wheat and olive cultivation in this large prime arable area. These conclusions are supported by the historical sources. Whitelaw points out that contrasting densities of olive and wine presses can throw

light on the differing importance of these crops in a region (Whitelaw 1991: 421-3). However, in Crete, wine presses are often in private houses, partly hiding the scale of past vine cultivation. Clustered features cannot always be read off directly as relating to a focus on a particular kind of land-use in their vicinity - old *alonia* or threshing floors are positioned in windy areas, to aid in the task of winnowing<sup>14</sup> although large numbers do suggest significant grain cropping. On the use of *alonia*, see Allbaugh 1953: 249; Halstead and Jones 1989: 43-6; Whitelaw 1991: 440; Amouretti 1986: 70-2). Terraces are notoriously difficult to date (Moody and Grove 1990; Whitelaw 1991: 409; Rackham and Moody 1992; Rackham and Moody 1996: 140-5; Foxhall 1996). Terrace forms often indicate their past use, a point made in some of the above studies and confirmed by the fieldwork described in Part 2. Wide ones (usually up to about 5-6m) were nearly always for grain, vines, or pulses, while small individual 'pocket' terraces were for tree crops. Bulldozed terraces are now used for any kind of cultivation. Boundary walls are just as difficult to date as terraces, and had various functions. Long walls following contours show a past separation between grazing and cropping land, while smaller ones show property divisions. *Mandres* and *mitata* are common in the Cretan landscape, as we have noted. They are almost never found on the best arable land, but are located at widely varying distances from permanent residences. They often form part of mixed cultivation and herding complexes, with terraces, boundary walls and a variety of other features. They are often abandoned now, but some are restored and still in use or have been replaced by modern equivalents. Their current use, density of distribution and positioning can tell us much about how herding systems have changed, as we shall see in the case studies (Rackham and Moody 1996: 159-61; 173-5; Blitzer 1990; Whitelaw 1991: 419-421; Murray and Chang 1981).

Features relating to land-use in modern Crete include complex irrigation systems using large plastic-lined reservoirs or geological wells and hundreds of metres of heavy rubber hose. Most of these have appeared in the last 30 years, accompanying the rise of intensive agriculture. Plastic hothouses are concentrated on flat, sheltered areas, particularly on the south coast. Flexible wire fencing and gates now mark property and grazing boundaries; bulldozed tracks mark out territory to colonise with olives or the way to a *mandra* in use.

### Conclusions

A number of conclusions can be drawn from the discussion above which will prepare the way both for the fieldwork described in Part 2 and for assessment of the relationships between EIA Cretan

<sup>14</sup>See **Plates 1-3**, the last showing a modern adaptation of winnowing technique. **Plate 4** shows traditional ploughing with a mule team.

settlement, land-use and socioeconomic conditions. Large-scale socioeconomic developments have heavily influenced many aspects of the Cretan landscape's appearance and productivity.

Anthropogenic influence on the landscape is not always through actions as primary as the cutting down of trees, overgrazing or the imposition of monocultures, although all these have affected Crete. Many indirect forms of influence, particularly those connected with land ownership and intensity of exploitation, fragmentation of holdings, labour costs, export demand, and choices in settlement and fieldhouse patterns, have also affected past land-use and landscape appearance. The effects of change helped in turn to shape future forms and conditions of land-use. It appears (as we shall see in more detail in the case studies) that the productive value of the Cretan landscape is very much what is made of it by man, and that at periods of varying stress it can be made to yield substantially more or less of various desired products. When considering EIA site hinterlands we must relate their likely use to the prevailing socioeconomic context, as much as to their physical attributes.

## Part 2

### Subsistence implications of the LM IIIC settlement shift - case studies

#### Chapter 2.1

##### Assessing the relationship of settlement, subsistence and hinterland at EIA sites - methodology of the field studies

###### *Background of approaches to site hinterland characterisation*

Variations on the concept of identifying the economic catchment or territory of prehistoric sites using time/distance factors have been discussed since it was first developed by Higgs (Jarman et al 1972; Higgs and Vita-Finzi 1972; Roper 1979; Bailey and Davidson 1983). Bintliff expanded the methodology to assess in greater detail the productive capability ('potential') of land within a nominal catchment boundary, and thus the range of subsistence strategies available to the inhabitants of a site. Although he recognised the fact that Aegean prehistoric settlement was not always economically determined, his approach essentially searched for regularities in the relationship between environmental conditions and settlement. He concluded that

'In the Ayiofarango Gorge, the Argos, Sparta and Helos Plains, the Argolid, Messenia, soft limestone rendsina soil and a similar soil on calcic flysch accounted for the location of almost all prehistoric and ancient settlements...already in 1939 Nevros and Zvorykin pointed out that the soft limestone was and always had been of crucial significance in Crete; it constituted the level plateaux of the island, about one-third of the total island surface; long before our time it had been the source of agricultural development, used by man earlier than all other soil types, and on it were founded major towns such as Knossos and Phaistos.' (Bintliff 1977a: 98).

How far does the EIA settlement pattern fit to or diverge from the model of locations chosen for their prime arable hinterlands, and what level of analysis do we need to undertake to assess this? Given the issues surrounding the settlement shift, discussed in Part 1, we clearly have to consider a variety of factors in assessing the value of any hinterland to LM IIIC communities, including the likely practices in use and the scale at which they worked, the ease of access from defensible sites to arable areas, and (in the light of prevailing political insecurity) the potential for settlement self-sufficiency and for the physical protection of crops and animals against raiding. However, it is necessary to approach the data-gathering process without too many prior assumptions about the most desirable hinterland characteristics.

Conclusions about these should result from consistent comparisons between case studies.

Knowledge of the range of exploited species and climatic conditions at the period in question helps in setting the parameters of expected subsistence practices (see previous chapters). My approach uses local ethnographic and historical data to understand the potential variability of subsistence priorities, and their relationship to settlement under different sociopolitical frameworks.<sup>1</sup> The questions I was concerned to answer for the EIA were as follows - what were the implications of different types of defensible settlement location for subsistence practice, and what was the relationship of hinterland potential to settlement longevity and expansion in the PG and later periods? The types of data I set out to acquire in my fieldwork are set out below.

### *Site selection*

Six study areas were selected which allowed chronological and typological contrasts in settlement to be explored in relation to hinterland potential. **Figures 2.1-1-4** show the sites and contemporary settlements in their regions. All of the sites selected are established in LM IIIC and come into the 'defensible' category (see Chapter 1.3).

It appears that EIA settlement distribution in Crete involves much smaller-scale political boundaries than those perceived (e.g. by Bennet 1990) for the LBA, making the choice for study of several sites located within the same broad region (the western Mirabello Bay, east Crete) a valid one in my eyes. These sites contrast in local topography and environment, size and continuity of occupation. The Tapes cluster is chosen because at 800-1100m asl, it is located at what seems to be the highest altitude limit for LM IIIC-SM occupation. Kritsa Kastello belongs to the largest size class of LM IIIC-SM sites (over 30 000 sq m), and is the only one of the studied sites artificially fortified. This highlights the importance of defensive considerations there beyond doubt. All these sites are abandoned in SM, probably in favour of a single large nucleation at Lato. In contrast, Vrachasi Anavlochos (located in the same broader region) is the site of a growing settlement from LM IIIC until the Archaic period. Profitis Elias Rokka and Korifi represent a kind of site typical for EIA central Crete - large, not highly-defensible '*acropoleis*' with long-lasting occupation (from LM IIIC into the Classical period). They are located in one of the most fertile and historically intensively-exploited landscapes of Crete. Chamaizi Liopetra is another large and long-lived site, but this time of very defensible type, and with a coastal location in the far east of Crete. The Frati sites illustrate the LM IIIC cluster formation phenomenon occurring in the west of the island, an area important to include

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<sup>1</sup> The main difference between my methodology and Bintliff's is my emphasis on the detail of local patterns of past land-use, using these sources.



in the discussion for comparative purposes. Many more contrasts between all the areas studied are identified and analysed in the following two chapters.

The desire to directly compare site hinterlands when assessing the character of subsistence and long-term settlement development led to a limit of 1 hour's range on foot from the site being set as the area to be studied in all cases. Preliminary research had seemed to bear out that the immediate hinterlands of most EIA sites had the potential to support their estimated populations, a hypothesis which I wanted to prove. One hour was used simply as a *minimum* hinterland, however, since as I showed in the previous chapter, historical/traditional subsistence ranges were often much larger and there is no reason to suppose EIA territories were confined to this limit. It was naturally important in both the fieldwork and the documentary research to look beyond the 1-hour range in order to fully understand past and present subsistence practice and land potential in each area. **Figures 2.1-1-4** show the 1-hour ranges of the studied sites and their neighbours, estimated from map-based calculations (following the method of Bailey and Davidson 1983).<sup>2</sup> The whole hinterland characterisation technique is used here only as a tool to provide easily-comparable data for a number of sites, *not* as part of an environmentally deterministic interpretative framework (Bailey and Sheridan 1981: 10; Tilley 1981).

### *Types of data recorded in the study*

#### Soils

My concerns were with the qualities of the soil for cultivation in antiquity - i.e. ease of tilling (degree of stoniness and induration), drainage qualities, and broad chemical composition. Soils were described as individual types in each study region according to factors of average depth, parent material, inclusions and formation processes, degree of visible horizon development and horizon/surface composition, colour (dependent on oxidation or leaching processes) and surface vegetation/ land use. The types were mapped at the level of 0.25 ha units. Descriptions of texture, because mainly concerned with workability, were done by hand and eye rather than by mechanical analysis, e.g. of particle size (Russell 1973: 65-7). Samples were taken of each visually-identified variant in order to measure pH, carbonate content, and cation exchange capacity. The use of these types of analysis as part of soil fertility assessment in Crete are paralleled by the studies of Bintliff and Morris (Bintliff 1977a: 609-14; 1977b; Morris 1994, Morris et al forthcoming). The significance of the type of analyses performed is summarised in

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<sup>2</sup>Estimates using this method proved reasonably accurate when compared with real 1-hour ranges on the ground at the case study sites, but slight discrepancies can be noted.

the table below and by Russell (Russell 1973: 40-43; 65-7; 90-101; 118-121). Details of the procedures followed are listed in the Appendix. Quantification of water-holding ability and particle size analysis, valuable in land potential assessment and used in Morris's studies, could not be carried out within the scope of this study.

**Table 2.1-1 Significance of soil analyses carried out as part of the fieldwork**

Analysis	Significance
pH	Relates strongly to recent climatic environment and to humus content. Allows comparison of generic soil type between regions. Nearly all soil types in Crete have a high pH. pH below 5.6 can affect calcium availability.
Carbonate	In nearly all soils in Crete showing high carbonate content, this is mostly calcium carbonate, a valuable soil nutrient.
Cations, expressed in milliequivalents (m.e.) of potassium, sodium, calcium and magnesium/CEC	The main soil nutrients measured in their available quantities. Allows broad comparisons of fertility between soils. CEC is a sum of these four major nutrients. Proportions of various elements in a soil can affect each other's availability to plants - e.g. high amounts of calcium can affect magnesium and potassium uptake (Russell 1973: 55-59). Soil temperature and moisture also affect availability.

Surface vegetation/land-use was recorded for each mapped soil unit, and was considered in relation to the analysis results. The opportunity was taken (Chapter 2.3) to cross-relate the soils from the different case studies to each other, and to the published soil descriptions and analyses referred to above. Apart from these studies, very little detailed soil mapping has so far been done for Crete. It was found (as in other studies) that a single soil type could vary greatly in its qualities across the zone where it was found, and the analysed samples can act only as general indicators of a type's characteristics.

Bintliff's observations on the shallowness of soil deposits in Greece proved true for the present studies, with many examples having an average depth of not more than 0.3m (Bintliff 1977a: 87-106; also see Morris 1994; Morris et al forthcoming). Samples were usually taken at about 0.1 - 0.15 m below the ground surface. Often horizonation was not clearly visible.

When it could be discerned, extra samples were taken from the different horizons and separately analysed. The results of some of these analyses are shown in the Appendix. They indicate that the chemical characteristics of horizons within a single profile can vary considerably.

### Vegetation and current land-use

Vegetation cover, like soils, was recorded in 0.25 ha units. The widespread decline of cultivation within the last 50 years means that areas of 'ex-cultivated' or semi-wild vegetation are common, and a combination of age and species information have to be used to differentiate these, and to date the period of abandonment or change of land use. Trees, particularly olives, oak and carob, may be approximately dated by trunk girth (Hayden et al 1992: 315), and a rough estimate of age was made for each grouping of trees recorded, to contribute to the picture of changing land use over time. The botanical detail with which ecological communities were identified was limited to what the purposes of the study required and my knowledge allowed. However, the main groupings of wild, semi-wild and cultivated species previously recognised for Crete, and variations on these (see Chapter 1.4) were consistently identified and recorded, in order to describe the exact nature of current land use in an area and to aid in reconstruction of past land use and land potential.

### Cultural features

The method and aims of the fieldwork differed from those of intensive archaeological surveys like those recently carried out in Crete (see Part 1). Rather, the recording done here was of an *extensive* kind: the presence of any cultural features was primarily of interest for what they could say about past patterns of land use. Although the location, approximate size and date was noted of archaeological sites of all periods as indicated by surface scatters, this was done as only part of a more general study of cultural features. No further studies of surface pottery were made beyond a general dating through observation. In order to reconstruct land-use/settlement history in relation to land potential, ancient or historical settlement sites which were interesting and worthy of further study in their own right had to be considered together with less impressive or more recent cultural remains relating to past (often relatively recent) land use - e.g. terrace systems, *alonia*, *mandres*, *mitata*, wind- and water-mills, among many others. In this context there was no reason to undertake detailed recording beyond brief notes of features' dimensions, appearance and date/state of preservation, except to illustrate a few well-preserved or unusual examples. All cultural features dating up to the 1970s were noted, with their condition sometimes helping to indicate their approximate date. Features of recent date

(last 100 years) were the most commonly preserved (some are still in use). Most preserved features which can be directly related to past land-use date only within the last 400 years or so. While these amply illustrate the long-term complexity of the relationship between settlement, land-use and land potential in each area, no features actually relating to land-use in the EIA could be identified from the studies.

Numerous examples of recorded features are cited, and their significance discussed, in the text of the next chapter. All are shown on the maps which accompany each study. The full databases of cultural features recorded in each area are not presented as part of this work, since the total number of sites noted (more than 1000) means that much organisation of the data remains to be carried out. The intention is to further interpret and publish this data elsewhere.

#### Past land-use - ethnographic and local historical research

Field observations were checked against and usefully enhanced by local historical and ethnographic information. These sources aided in the dating of cultural features, and in reconstructing the form and date of past land use in areas where it was not indicated by cultural features. This kind of information was acquired through interviews with local people, and by research in various primary and secondary written sources referring to past landscape character and local economy.

#### *Combination and analysis of the data - classification of land potential*

Part 1 of this study has illustrated that we cannot classify land's subsistence potential in the past based on present-day observations without looking at long-term change in local and larger-scale economic and social frameworks. Given the complexity and flexibility over time in perceptions of what constitutes grazing land in Crete, for example (discussed in Chapter 1.5), Bintliff's categories of 'poor grazing' and 'good grazing' which seem to be based very largely on current land use, appearance and soil characteristics, seem too direct in their assumptions from present-day to past land use (Bintliff 1977a: 605-67; see his note of caution: 626). Here, I assess the productive potential of all land in the 1-hour range of a site with regard to potential for both herding and agricultural exploitation in the past, on the basis of the combination of data types discussed above. Land potential is graded on criteria applied consistently to all the case study areas. 'First-class/prime arable' refers to land which would be of the highest potential under a dry farming regime, possessing a combination of the following features: physical workability of soils; gentle gradient; evidence for intensive and regular historical/traditional use; (usually) relatively high chemical fertility. It is apparent, however, that the relative quality of the best arable land can vary between the case study areas. This is

addressed in the conclusions from the field studies (Chapter 2.3), and discussion about the development of settlement in different areas may be enhanced by recognition of these variations. For the purposes of the present study, though, the grading of land potential types between areas was not crucial and the categorisations used were adequate to assess carrying capacity in each area, and to maintain consistency between the studies.

‘Second-class arable’ here is land which can be shown through the presence of certain cultural features to have been used as arable at periods in the past, and which may be used as such today, but is of a relatively thin, rocky and steep character and has been less regularly or intensively used in the past than prime arable areas. ‘Probable second-class arable’ is land which has no apparent evidence for past cultivation but which seems to be of very similar character to second-class arable in the same area. ‘Uncultivable’ areas are large extents of extremely thin soil or bare rock, with no evidence of past or present cultivation. The last category is the most difficult to grade, since geomorphological change may have reduced soil cover in some cases, but when gradient and land use history are taken into account, a little more support is lent to this designation. It will be observed from the land classification maps accompanying the case studies that the last category is much the smallest, and the tendency of the study has been to put land into the probable 2nd-class arable, rather than uncultivable, class where there is any chance to do so, rather than assume too much about past land-use preferences. The result is to show the maximum possible cultivated area, with a margin of error which allows both for limited geomorphological change within a region (as discussed in Chapter 1.4) and for the fact that some potentially ‘arable’ areas might have needed clearance and/or improvement in the EIA to enable cultivation actually to take place.<sup>3</sup> I outline the assumptions made about grazing land below.

#### *Carrying capacity (Tables 2.2-3, -4, -7, -8, -11, -12, -15, -16, -19, -20, -23, -24, -25)*

After assessing land potential, it was possible to work out approximate carrying capacity for the 1-hour range of each site, again providing a consistent comparison measure between site hinterlands. Dry farming, and the yields/requirements discussed in Chapter 1.5, were assumed in each case. The calculations were as follows:

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<sup>3</sup> The degree of incentive and ability to invest labour needed for such improvements are obviously impossible to reconstruct for the EIA on a case-by-case basis. The implications of the settlement shift for investment in land improvement are discussed in Chapter 2.3.



1. A maximum and minimum value for carrying capacity were calculated according to whether prime and second-class arable *only* were used as the basis for calculation, or probable second-class arable was also taken into account.
2. Second-class arable areas were halved in two of the alternative calculations, and probable second-class arable areas were halved in all of them, to allow for lower productivity in comparison with prime arable. This seemed to allow adequately for over-estimation of land potential and for necessary extra labour input on stony/steep land, although it is impossible to estimate for exact variability in productivity on different qualities of land. In all, 4 alternative calculations, assuming differing extents of agricultural land use, were made.
3. Carrying capacities for each 1-hour range were calculated allowing a maximum of 1.2 ha of land per individual on annual fallow rotation and assuming a 100% reliance on cereal produce (see Chapter 1.5). The estimate of 1 ha of arable fallow needed to support a grazing animal was used, together with the estimated requirement for an individual on a mainly animal-product-based diet (of c. 50 animals - see Halstead 1996: 34 and Chapter 1.5), to add the number of individuals which could be sustained from herding on land in the 1-hour range (see discussion on the types of land assumed to have been grazed, above). Since all land which could be cultivated could also have been grazed, I produced maximal potential grazing figures by combining the area of cultivable land with uncultivable zones (excluding massive expanses of bare rock). However, it might be argued that only cleared, cultivated fallow or excultivated land can be assumed to have been grazed, so a figure which assumes that only all potentially cultivable land was grazed was also calculated, although this is obviously rather an artificial one.
4. Bintliff's argument for the average use of only 30-40% of carrying capacity at prehistoric sites was used to calculate an alternative figure for carrying capacity (Bintliff 1981: 40). However, based on historical and ethnographic studies in Crete generally and in the case study areas, and in view of the high density of EIA sites in most of the areas studied (with their 1-hour ranges often overlapping each other), it seems better to assume an alternative, heavier use of local carrying capacity. Maximal use of the 1-hour range is also highly unlikely, however.
5. Population was assessed using a method proposed by Nowicki for LM IIIC-SM settlements with agglomerative plans (Nowicki 1990: 177). This method uses the excavated area of Karfi, with 25-30 houses and the estimation of 5-8 people per house, as the basis for suggesting c. 125-240 people per 6000 sq m of agglomerative architecture (an estimate roughly paralleled by Morris's calculations for Vrokastro and other EIA sites; Morris 1991: 33). The method is often problematic and needs to be used with caution, particularly when architecture does not appear to be agglomerative or a site is known only from surface sherd scatter. It seems to me unlikely



that dwellings the size of those at Karfi regularly housed as many as 8 people, and the figure of 5 people per average-sized house seems more representative. For the sites studied here I therefore use a range based on a modification of Nowicki's method, i.e. assuming c. 125 to 150 people per 6000 sq m of built area, with the reservations already mentioned.

The next chapter presents the case studies. The maps showing the data acquired in the fieldwalking are found in Volume II. The text gives a short description of each area's topography, geology, soils and drainage. This is followed by a physical description of the defensible site(s) concerned, with details of chronology and of estimated average size during the LM IIIC-PG period. The data presented on the maps is then discussed in detail, along with information from ethnographic and documentary sources.

The maps are designed to layer the different categories of information. A hand-held GPS (Global Positioning System) was used to provide numerous reference points for all the types of mapping undertaken in each survey area. The type of data presented here is ideally suited to incorporation in a computerised GIS (Geographic Information System) but the scope and time constraints of this study did not allow the construction of such a system. It is hoped that the information from some of the case studies will, however, later be incorporated in a pilot GIS for east Crete which has recently been developed.<sup>4</sup> In Chapter 2.3 the general conclusions drawn from the case studies are presented, in an analysis relating various aspects of LM IIIC-SM settlement to hinterland potential.

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<sup>4</sup> By the Institute of Mediterranean Studies, Foundation for Research and Technology Hellas

## Chapter 2.2

### Case studies: characterisation of the hinterlands of some Early Iron Age defensible sites<sup>1</sup>

#### CASE STUDY 1 Frati Kefala and Kefali

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In the Rethymnon *nomos*.<sup>2</sup> Nearest villages: Frati, Ayia Pelagia, Mixorrouma, Koxare

Map sources used: Greek Army Geographical Department 1: 5000 topographical maps:

*Melambes* Sheets 9222/8 (here labelled I), 9532/2(II), 9532/1, 9522/7. Institute of Geology and Mineral Exploitation, 1972, 1: 50 000 Geological Map: *Melambes* Sheet

**Figures 2.1-1, 2.2-1-5, Tables 2.2-1-4, Plates 5-12**

The area studied is located at the southern edge of the Ayios Vasilios valley in the Rethymnon isthmus (**Figure 2.1-1, 2.2-1**). Kefala has some traces of occupation into PG-A, and Kefali too may extend into PG, but the main period of occupation at both sites is LM IIIC-SM (Nowicki 1992a: 118; Nowicki 2000: 201-4; Moody et al 1998a, 1998b; Moody pers comm). A recent intensive survey covered an adjacent area and included Kefala, but not Kefali (Moody et al 1998a, b; Moody et al forthcoming). The two sites form a cluster, with very largely overlapping territories.<sup>3</sup> Kefali is more intrinsically defensible than Kefala, with sheer cliffs to W and E, but neither site has all its sides naturally protected.

Kefala comprises two smaller hills. The *Podi* or lower hill (500 m asl) is joined by a saddle to a slightly higher hill (c. 520m asl) on the SW. The remains of a cap of hard Jurassic limestone form the highest point, the rocky ridge on the SW, but the slopes below this are formed by metamorphic flysch. The soil mantle is thin on the higher, most eroded parts of the slopes, but reaches depths of 1m+ towards the valley floors on both sides of the hill. Kefala acts an important watershed for rainwater. The runoff takes the form of numerous small streams, some of which are seasonal, down the north- and south-facing slopes. The water eventually joins year-round rivers, which run in the valleys each side of Kefala and curve around to flow into the two large gorges flanking Kefali. Frati village lies on the platform of lower-lying land between Kefala and Kefali, at the heads of the gorges.

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<sup>1</sup> All fieldwork took place between 1997 and 2000.

<sup>2</sup> Large regional unit, of which there are four in Crete.

<sup>3</sup> The fieldwork presented here does not cover the full 1-hour range of Kefali, although it includes a considerable area of the land within it. See note 10 below.

The geology of Kefali and the slopes of the Kouroupas massif, across the gorge to its W, is dominated by hard limestone. This outcrops frequently on the hill, but small areas of flysch exposed on the N slopes. The C5 soils found here also cover the summit and upper slopes of Kefala's higher hill (**Figure 2.2-2, Table 2.2-1**). The soils C5, C15 and C20 are all of a similar terra rossa type. Thin soils over flysch (C6, C7 and C8) cover the lower slopes of the two hills and parts of the Frati platform. The Ayios Vasilios valley floor and much of the Frati 'platform' are formed by flysch and hard limestone weathering products from the surrounding slopes, transported and mixed to form thicker and finer-sorted deposits (C9 and C10). In both these areas, the bedrock of soft limestone or breccia weathers and erodes easily to form a mixture with the products washed down from above. The presence in the area of outcrops of serpentinite and other rocks of the ophiolitic series (particularly at the western edge of the Ayios Vasilios valley and on the slopes of Kouroupas) mean their transported weathering products are sometimes included in these soils. The soils in the lower areas are generally less permeable than those derived from the limestone, and consequently well-drained. Some 'slumping' onto the valley floors is suggested to have occurred during the Holocene (Moody pers comm). This means that the depth and quality of soil cover must have changed somewhat since the EIA. However, many of the main soil characteristics must have been the same as they are today.

### *Settlement history*

Settlement pattern can be reconstructed at a very general level for the prehistoric and historic periods in this area. A recent intensive survey covered the area of the southern Ayios Vasilios valley and included Frati Kefala (Moody et al 1998a, 1998b, forthcoming). FN/EM material was found at Atsipades Korakies and from the summit of the ridge at Fonises. The peak of Korakies was an MM peak sanctuary (Peatfield 1992) and there was another peak sanctuary on Spili Vorisi, E of this study area (Nowicki 2000: 200). There are several small MM settlements close to the valley floors in the region (Moody et al forthcoming). The rocky knoll NW of the main peak of Kefala has been noted as a small MM II defensible site (Nowicki 2000: 203; Moody et al 1998b).<sup>4</sup> In LM III A-B, there were small to medium-sized settlements at Spili Kefala and Koxare Ayios Markos, located on low hills immediately above the valley floor (Hood and Warren 1966: 174; 177). There is now evidence for a sizeable (20-30 000 sq m) LM IIIA-B settlement at Koxare Aloni (Moody pers comm; Moody et al forthcoming), with nearby contemporary hamlets or houses also noted by the survey. At the beginning of LM IIIC

<sup>4</sup> Referred to by Moody as 'Frati Crag'.

we see the movement to defensible sites on Frati Kefala and Kefali, Atsipades Fonises and Spili Vorisi (Nowicki 1992a: 118). Smaller dispersed settlement in the valley floor and low hills in the region accompanies the defensible site pattern, and perhaps relates to agriculture (Moody et al forthcoming; Moody pers comm). Examples include LM IIIC material at Koxare Ambelos, and sites at Angouseliana and near Nea Atsipades. Evidence from both Frati Kefala and Atsipades Fonises suggests continued occupation until and perhaps into PG (Hood and Warren 1966: 178; Nowicki 2000: 201-6). Koxare Ambelos may have been occupied continuously through the EIA (Moody pers comm), but otherwise there is little evidence for a large nucleated settlement of post-PG date in the region.

Dispersal of settlement to make the best use of the large extent of arable land seems likely in most periods, although there is a degree of nucleation in LM III. By Roman times settlements are likely to have been located once more on low-lying land, and may have been highly dispersed: Hood and Warren recorded a probable Roman farmstead W of Ayia Pelagia, also noted by Sanders as a probable villa (Sanders 1981: 164). Koxare Ambelo and nearby Ayios Markos have Roman occupation: at the former this continues from Classical/Hellenistic (Sanders 1981: 164; Moody pers comm). An extensive scatter of Byzantine-Venetian pottery covers the lower valley floor N of Ayia Pelagia (050, 058) and another extensive scatter of V-T date found on the Frati platform seems to be associated with the remains of a chapel once used by Frati (040, 090, 077, 087). Forts were located on Frati Kefali's summit (Venetian-Turkish), on the low hill S of Koxare Koule (Turkish), and on the top of the 'Koule' ridge immediately S of Ayia Pelagia (very small, probably Turkish). Those on Kefala and Koule probably acted as watchpoints only, while the Koxare example is a large Turkish *frurio* or garrison. All the above evidence suggests that the valley was fairly densely populated by the Venetian-Turkish periods.

The peak of historical population in all the villages occurred in the 1940 census, and does not seem to have risen above 500 for the four (Spanakis 1991: 48; 422; 542; 803). Ayia Pelagia, the smallest, does not appear in Venetian records and seems only to have been settled in the Turkish period (Pashley 1837 (II): 313). The other three villages have existed since at least Byzantine. The fairly high density of population, with numerous small villages only a few kilometres from one another, could be supported thanks to the high agricultural potential of the area. A degree of nucleation at both Mixorrouma and Koxare has taken place in the 20th century: many people now living in these villages work in Rethymnon and are no longer involved in or supported by agriculture. The locations of some villages have altered slightly in modern times. The old settlement of Mixorrouma (where population reduced from the 1950s onwards) lay closer than the new one to the river, and used its power for watermills. Kastané, the predecessor of Ayia Pelagia and partly used into the mid-20th century, lies on a low hill, at

the same height as the modern village but about 0.7 km to its west. Like Mixorrouma, the village has relocated to the line of the asphalt road, in this case the one linking Ayia Pelagia with Frati.

### *Current land cover (Figure 2.2-3)*

The area shows considerable diversity of land-use, both historically and in the present day. The higher slopes of Kefala and Kefali (above c. 400m asl) and the lower ridge adjoining Kefala to its east (here referred to as the 'Koulé' ridge) are covered by a low grazed garigue. On the rockier parts of the slopes, a more developed maquis of oak/spiny broom is found. Traces of past cultivation are often present in these garigue-covered areas, showing a change of use mostly in the last 30-50 years. The lower slopes north of Kefala, running down to the floor of the Ayios Vasilios valley (the area called Papoures) are currently used for irrigated olive, vine and vegetable cropping (**Plate 5**). Most of the olive plantations here are of fairly recent date (i.e. within the last 50 years). The small gullies or *revmata* traversing the slopes of Kefala hold a dense type of maquis vegetation, which is also seen on a more developed scale in the river courses.

Most of the older olives in the region (100-200 years+), often associated with stone-built 'pocket' terraces, are found E and S of Kefala, particularly on the river banks and around Frati village (**Plate 6**). More are found immediately N of Ayia Pelagia, on the Ayios Vasilios valley floor. The rest of this area, especially towards river on the W, is dominated by relatively new olives and by cereal cropping (including barley for human consumption, and fodder grasses). On the low hills at the head of the Kourtaliotiko gorge, older olives (up to 200 years old, with some probably older) dominate. Further to the SE, on the 'platform' around Frati, there is a fair expanse of land currently/recently used for cereals. An expanse of semi-natural woodland, including holm oak, maple and olive is located below the northern edge of the village. In the narrow flattish piece of land bounded by the west slopes of Kefala on one side and the eastern flanks of the Kouroupas ridge on the other, the dominant cultivar is young olives.

The diverse and intensive use of the area probably arises from the combination of several factors, including the low altitude, light, easily workable soils and the availability of large quantities of water year-round in the rivers. Olive cultivation has expanded in the low-lying areas over the last 30-50 years, as we have seen. However, the spread has covered a smaller proportion of the total cultivated zone than in several other regions studied here; there is still a substantial component of cereals and vines. There is clear modern favouring of certain land types for particular activities. Grazed areas are mostly located on the thinner and rockier



soils and steeper gradients, while olive and other cultivation is on lower-lying and more gently-sloping land, on soils with greater depth and fewer stony inclusions. Developed maquis is generally rare in the area, since most land has been long-established in productive use.

#### *Cultural features and past land-use (Figure 2.2-4)*

Relict terracing is extensive in this area. Terraces cover the N, S and W lower slopes of Kefala up to a height of about 400m, and both the N and S slopes of the Ayia Pelagia ridge. Interviews with local people indicated that as recently as 20-30 years ago these were cultivated in cereals. The N-facing slopes of the Ayia Pelagia ridge and of Frati Kefala were referred to as having been dominated by cereal cultivation in the past, although vine and olive now play the most important role here.<sup>5</sup> Many areas on the Ayios Vasilios valley floor now planted with young olives were said to have previously supported cereals. Terrace remains and the concentration of *alonia* around the modern settlement of Ayia Pelagia tell the same story (054-6). Previously more extensive cereal cultivation was referred to around Frati village, and there are still substantial areas under cereals in the E part of the Frati platform and on the lower S slopes of Kefala's SW hill. Several *alonia* are found immediately W of the village (091-094) (**Plate 7**). An *aloni* in a small area of cereal cultivation about halfway up the E slope of Kefali, noticeably isolated from the surrounding garigue and associated with the remains of an old farmhouse and animal enclosure (095/150), shows the historical use of this area for cultivation alongside grazing, though the latter has taken over today. The same indication is given by the complex of fieldhouses, terraces and boundary walls at 118 on the lower N slopes of Kefali (**Plate 8**).

The mill buildings at Kato Mixorrouma and further W along the river valley (**Plates 9, 10**) show the importance of both cereals and olives in the traditional agricultural regime. Local interviews indicated that there were formerly several watermill mechanisms at Mixorrouma, processing both cereals and olive oil. They were in use until the 1960s. From the 1970s an electrically-powered mill was used for cereal processing in (new) Mixorrouma village. Remains of another watermill (034/035) are located about halfway along the valley between Frati and Mixorrouma, and a well-preserved example was found in the valley due S of Kefali. A small olive press was once located close to Ayia Pelagia.

Boundary walls/and cultivation enclosures are common in the area and probably relate to the historically mixed, intensive use of land (**Plates 11, 12**). They are now located within grazed zones, as agriculture has retreated. Long boundary walls appear at 005 on the N-facing

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<sup>5</sup> Also indicated by *alonia* on the lower N-facing slopes of Frati Kefala's SW hill (e. g. 051).



slopes of Kefala (SW hill) and at 121, 132 and 217<sup>6</sup> on the N and S slopes of Kefali, where they usually separate areas of relict terracing from steep rocky slopes above, presumably used for grazing in the traditional system. Very large cultivation enclosures are found on the N slopes of Kefala's SW hill and as part of the complex 118. Small enclosures are still in use in the area for vine cultivation, and are usually relatively small (c. 8-900 sq m maximum).

Seasonally-used structures, relating to herding or cultivation activity at some distance from the main settlements, are rare here in comparison with the other areas studied. The few examples are at 150 on the east slopes of Kefali - more an outlying farmhouse than a fieldhouse - and the group of fieldhouses at 118 on Kefali's north slopes. Both examples were associated with cereal cultivation as well as livestock. The reasons for the scarcity of this type of structure probably relate to the density of small settlements in the area. The availability of large amounts of well-watered prime arable land must be partly responsible for the fact that large-scale grazing was never focused here, but on the steep, rocky slopes of the Kouroupas massif to the west.

### *Soils (Figure 2.2-2)*

Looking at the evidence for historical and recent cultivation in conjunction with the soil distribution in the area, we can see that the valley floors to the N and S of Kefala have consistently provided deep, fine-grained and workable soils through an ongoing process of weathering, erosion and transportation of hard limestone and flysch from the higher slopes and. This has apparently been underway since, and probably during, the LM IIIC occupation on the summits of Kefala and Kefali, since pottery has spread widely downslope, particularly on Kefali. The drainage pattern may have varied somewhat in antiquity, but the channels cut by the two rivers indicate that they have kept their courses for a substantial period of time.

The soil type with the most fertile potential appears to be C9, a deep, loose and well-sorted deposit on the floor of the Ayios Vasilios valley. Its high CEC is due mostly to a high calcium carbonate content. In general the CECs of other soil types in the area are low, but as we have seen, this has not restricted the spread of historical or present day cultivation, particularly on the C6, C7, C8 and C10 soils, and to a lesser extent on the C5, C15 and C20 terra rossas. Although these last soils have higher CECs than those on flysch or derived from flysch weathering products, they have consistently been less historically favoured for agriculture, probably thanks to their thin and rocky nature and steep gradients, which make soil management and cultivation difficult.

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<sup>6</sup> The last is not shown on the 1-hour range map.

**Table 2.2-1 Soil codes and descriptions for the Frati area (Figure 2.2-2)**

Code	Munsell colour	Description of physical structure and appearance
C4		Generally purple/dark greyish brown. Loose <i>in situ</i> weathering products of phyllitic flysch, very unstable, with no cohesive structure.
C5	7.5YR 5/2	Silty sand. Fairly compacted, often with indurated surface. <i>In situ</i> terra rossa, mostly comprising weathering products of outcrops of hard grey limestone, but also flysch-derived products from exposed bedrock areas. Thin cover on higher hill-slopes and summits, up to c. 0.3m.
C6	10YR 6/3	Sandy silt. Loose. Predominantly derived from <i>in situ</i> weathering products of phyllitic flysch and some transported products of hard limestone. Found on gentle lower slopes of Kefala and thus of thicker depth in general than C5.
C7	7.5YR 5/4	Sandy silt. Compact texture. Profile development visible. Closely related to C6; usually found on gentle slopes and directly overlying pure flysch bedrock. Incorporates <i>in situ</i> and transported weathering products of phyllitic flysch. The profile has 2 distinct horizons, the upper being a light greyish-brown colour and containing larger fragments of the parent rock than the lower (up to 0.2-0.3m average diameter). The lower horizon, immediately above bedrock, has the brighter brownish-red hue and slightly smaller inclusions.
C8	2.5Y 7/2	Sandy silt. More sandy, stony and loose in texture than C6 and C7, to which it is related. Formed from transported flysch and hard limestone weathering products. Contains frequent inclusions of quartz, up to 0.2m in diameter.
C9	2.5Y 6/2	Clayey silt. Loose. Found on the Ayios Vasilios valley floor and represents deep deposits of weathering material from the slopes above, predominantly flysch-derived but including the weathering products of hard limestone and ophiolitic rocks. Few large inclusions.
C10	10 YR 5/3	Clayey silt, fairly compact. Deep deposits (1m+). Derived from a transported mixture of hard limestone, flysch and ophiolite weathering products.
C15	7.5YR 5/3	Silty sand. Loose. Terra rossa derived <i>in situ</i> from hard limestone. Frequent angular inclusions of hard limestone, up to 0.3m diameter.
C16	10 YR 5/3	Sandy silt. Loose. Transported weathering products of hard limestone, with a limited incorporation of flysch-derived weathering products. Similar or identical to C5, but in thicker deposits with fewer, small inclusions of hard limestone frags, up to an average of c. 0.1m diameter.
C20	2.5Y 5/2	Sandy silt. Loose. Transported terra rossa, derived from weathering products of hard limestone. Closely related to C15, with frequent small- to medium-sized inclusions of hard limestone.

**Table 2.2-2** Chemical characterisations of soils in the Frati area

Soil code	Percentage of 1-hour range	pH	Carbonate (%)	K (m.e.)	Na (m.e.)	Ca (m.e.)	Mg (m.e.)	CEC (m.e.)
Rock	7.4	not tested						
C4	2.5	not tested						
C5	22.8	5.59	0	0.65	0.09	5.11	1.10	6.95
C6	41.8	6.47	0	0.09	0.93	6.24	1.24	8.50
C6		6.58	0	0.46	0.16	10.10	2.26	12.98
C7	5	6.33	0	0.31	0.13	8.36	1.64	10.44
C7		5.99	0	0.12	0.21	3.80	2.72	6.85
C7		7.13	0	0.36	0.20	9.95	1.85	12.36
C8	2	5.61	0	0.07	0.12	1.15	0.72	2.06
C9	9.6	7.26	12	1.01	0.19	162.05	2.60	165.85
C10	3.6	6.37	0	0.42	0.13	12.10	2.90	15.55
C15	2.1	6.85	0	0.80	0.18	50.40	1.73	53.11
C16	2.2	not tested						
C20	0.95	7.08	0	0.51	0.32	20.08	2	22.91

**Table 2.2-3** Land potential calculations for the 1-hour range of Frati Kefala/Kefali (see Figure 2.2-5)

Total 1-hour range	1100 ha
Total area of 1st-class arable	556.5 ha
Total area of 2nd-class arable	127 ha
Total area of probable 2nd-class arable	212 ha
Combined probable and certain 2nd-class arable	389 ha
Very poor/uncultivable	129 ha
Rock	75.5 ha

**Table 2.2-4** Carrying capacity calculations for the 1-hour range of Frati Kefala/Kefali<sup>7</sup>

Description	Quantity
Total area/animals grazed	1100 ha
Prime + 2nd-class arable + (prob. 2nd-class arable x 0.5)	789.5 ha
Prime + (2nd-class and prob. 2nd-class arable x 0.5)	726 ha
Prime + 2nd-class arable	683.5 ha
Prime + (2nd -class arable x 0.5)	620 ha
No. of individuals on 100% cereals <sup>8</sup> , annual fallow	658 or 570 or 517 or 605
No. of individuals on 100% animals (figure in brackets assumes all land in 1-hour range is grazed; others assume only cultivated, i.e. cleared, land is grazed)	16 or 15 or 14 or 12 or (22)
Total no of individuals able to be supported (agriculture and herding, assuming herding on all cultivated land only). Figure in brackets assumes herding on all land in 1-hour range	674 (680) or 585 (592) or 531 (539) or 617 (627)
40% of total	270 (272) or 234 (237) or 212 (216) or 247 (251)
Estimated size of the settlements (Nowicki 2000: 201-4; Moody pers comm) (minimum)	Kefala - c. 15000 sq m Kefali - c. 10-15000 sq m
Estimated population for both settlements (minimum) <sup>9</sup>	c. 521-750

### Conclusions

The Frati Kefala settlement, at a size of approximately 15 000 sq m, seems likely to have had a population of at least 250-300 people. The Kefali settlement is more difficult to accurately gauge the size of, but would seem to have covered at least another 10 000 sq m. 750-900 ha of prime arable land (more of second-quality land) would be needed to support the inhabitants of the two sites. The fact that historical population in the area was around 500 shows that the same general area can sustain this many people (with a fairly intensive use of land). If *all* prime and second-class arable (including a large portion of probable second class arable) was exploited, the population of both sites could practically have been supported from the 1-hour territory, but this degree of intensive use is unlikely. Exploitation beyond the 1-hour limit almost certainly took place, perhaps onto the fertile floor of the Ayios Vasilios valley or the

<sup>7</sup> This table, with its explanations of the calculations used, acts as a template for the same calculations used in all the other case studies.

<sup>8</sup> See Chapter 2.1 - these '100%' assumptions are wholly artificial, but are made in order to produce maximal figures for carrying capacity.

<sup>9</sup> See Chapter 2.1 for method of estimating population.

Lefkoyia plain at the S end of the Kourtaliotiko gorge.<sup>10</sup> Like traditional Frati and Mixorrouma, the EIA settlements are likely to have had a large overlap in the territory they exploited, particularly in the area of the Frati platform. This may have been accommodated through alliance/land-sharing or some complementary practices/functions for the two communities. The river resources, like the arable, must have been used by both sites.

There is no fundamental ecological difference between the EIA site locations and the surrounding valleys and low hills where most prehistoric and historical settlements were situated. Current land-use and (related) soils differences are mostly responsible for differences in vegetation cover between the hills and the surrounding land. Although there are springs on both hills which could have served the EIA settlements, the rivers meant settlement anywhere in the wider area would have been possible without losing access to water. Although the arable hinterland exploitable from the traditional and from the LM IIIC-SM settlements is very similar, the EIA settlement locations are clearly less convenient, both with regard to the arable land and the main water sources, than those of any other period. However, they have other advantages, especially defensibility (the Venetian -Turkish watch-point on Kefali indicates the enduring value of the location for this purpose). The sites have very good strategic views, particularly when working together, since each blocks the other's view in one direction, and good visibility/recognisability from a distance.

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## CASE STUDY 2 VRACHASI ANAVLOCHOS

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In the Lasithi *nomos*. Nearest villages: Vrachasi, Latsida

*Map sources:* Greek Army Geographical Department, 1:5000 maps, *Ayios Nikolaos* Sheets 9623/1(here labelled II), 9623/2(I), 9623/3(V), 9623/4(IV). Institute of Geological and Mineral Exploitation, 1972, 1: 50 000 Geological Map: *Ayios Nikolaos* Sheet

**Figures 2.1-2, 2.2-6-10, Tables 2.2- 5-8, Plates 13-17**

The ridge of Anavlochos (500-600 m asl) lies directly N of the village of Vrachasi on the N side of the Neapoli-Selinari 'corridor', a broad valley running NE - SW (**Figure 2.2-6, Plate 13**). It is difficult to scale the ridge at many points on the S, except at the saddle where the site itself is located, and just behind the village of Vrachasi. Even these routes involve steep

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<sup>10</sup> The initial fieldwork was later extended to cover the region S and W of Kefali, to provide a wider characterisation of the hinterland of the settlement there. The results of this additional work will be published in a future paper.

climbing, near-vertically over rocks in some places. Particularly defensible are the NE slopes - very steep and rocky, with cliffs in parts. However, at various other points on the N the ridge can be climbed within about half an hour. Its size is too large to make it highly defensible, but it does have a strategic viewpoint, looking N to the wide approaches from the sea over much lower-lying land and S over the Neapoli-Selinari valley. This is bounded on the S by the steep Selenas ridge, and links the area around Ayios Nikolaos with the coastal plain of Malia on the north coast. A fast asphalt road now runs in the valley. Historically, a major transit route also ran across the low hills to the north of the ridge (Platakis 1971: 97; Karavalakis 1987: 5-6). The area is rich in settlement of the EIA. Dreros, Milatos, and Anavlochos itself have occupation from LM IIIC through to Archaic times, and in the case of Milatos until Hellenistic (Figure 2.1-2; Xanthoudides 1918: 23-30; 1921, 154-157; Marinatos 1936; van Effenterre 1948; Duhoux 1980:33; Kanta 1980: 125-8; Nowicki 2000: 171-3). The sites appear not to have any breaks in their occupation, although excavation would be required to confirm this stratigraphically. LM IIIC sites in the area which were not occupied into the later part of the Iron Age include Neapoli Kastri, opposite Anavlochos across the valley to the S, and a number of sites in the northern foothills of the Lasithi mountains, SW of Neapoli.<sup>11</sup> It seems that by the PG period, settlement was becoming more nucleated, as elsewhere.

The first archaeological observations on Anavlochos were made by Demargne, who classed the material on two summits of the ridge and the saddle between them as of PG-G and later date (Demargne 1931). Improved knowledge of EIA pottery since the time of Demargne's observations has allowed identification of LM IIIC occupation material on the site, particularly on the western, higher, and more craggy summit (Farnoux and Driessen 1991; Nowicki 2000: 172). SM?-PG tombs were found in the close vicinity of the site at the northern base of the ridge (Demargne 1931; Nowicki 2000: 172; Kanta 1980: 128). Important in showing how the site was defended through at least part of its lifespan are the remains of a (not clearly datable) fortification wall in the N part of the saddle (Hayden 1988: 16-17; Farnoux and Driessen 1991).

The ridge has upper strata of hard Jurassic limestone (which form the peaks) sitting atop the phyllite-quartzite series. Sandwiched between them are softer limestones, which have been much quarried. They produce D3 type soils (Figure 2.2-7; Table 2.2-5), where soft limestone weathering products are overlain by a thin layer of those from the hard limestone. The line of unconformity between permeable and impermeable rocks shows at about 340m asl, and the traditional and modern location of Vrachasi village is at this height, presumably to take

<sup>11</sup> These sites are discussed in the Tapes case study, below.



advantage of the resultant (year-round) springs. The hard limestones on the ridge top and slopes produce terra rossa soils of a generally thin and rocky nature (D1) while the products of the phyllites on the very lowest slopes and valley floor (D6) form thick, loose and workable deposits. Soft limestone forms many of the low hills (200-300m asl) N of Anavlochos, producing soils similar to the D3 type, but there are also outcrops of hard limestone and phyllite-quartzite, and thus localised variations in soils. S of Anavlochos, phyllite-derived soils in the valley give way to hard limestone-derived terra rossas again on the northernmost edge of the Selenas range at c. 230m asl. On this side of the valley too, the soft limestone appears again, exposed in large areas. There are scatters of EIA sherds on low hills in the phyllite-quartzite formations N and S of the ridge (see below) suggesting that despite ongoing erosion and deposition down the slopes, there have not been major geomorphological changes - e.g. large-scale slumping - since this period.

Year-round drainage in the area is currently poor, although the artificial irrigation which is now widespread has perhaps dried up some of the natural sources. The Anavlochos ridge has some streams flowing down its S slopes, but none contains more than a slight trickle of water in the summer. In the valley there is a bigger seasonal stream. The main spring in the area is the one already mentioned at Vrachasi: this is of a large volume.

### *Settlement history*

Intensive archaeological survey has never been undertaken in this area, so that much of the prehistoric settlement pattern remains unknown. A possible MM peak sanctuary has been identified on the summit of Vigla, on the eastern end of the Anavlochos ridge (Nowicki 1994: 48). LM I-III occupation is known from the vicinity of Milatos, and in LM IIIC there was a settlement on this defensible knoll of Milatos Kastello and at Neapoli Kastri. There is a lower-lying site of c. 8500 sq m immediately N of Anavlochos, dated to LM IIIC-PG (118), and one, datable somewhere in PG-A, located S of the ridge (056; see **Plate 14**). Both are about 20 minutes' walk from the summit and suggest agriculturally-related satellite settlements, located on deeper, more easily worked soils than those of the main site. Demargne noted the presence of numerous PG-G sherds at the bottom of the ridge on the N and E. Site 118 probably corresponds to this scatter (Demargne 1931: 368-9).

Anavlochos and Milatos developed into substantial settlements in PG-A, and it seems most likely that the territorial boundary between the two would have run in the foothills N of Anavlochos, as traditionally. Milatos continued into Hellenistic. Little is known about the period between Hellenistic and late Byzantine in this area. Roman coins have been found in the vicinity of Dreros, and there are Roman burials at Vrachasi (Sanders 1981: 141; Sakellarakis

1965: 565), indicating a settlement somewhere nearby. In the historical period, Vrachasi and nearby Latsida were sizeable villages. First mentioned in 1391, Vrachasi had 475 people and Latsida 740 by the late 16th century (Spanakis 1991: 202; 471). Population increased further by the 19th/early 20th century, but since the 1928 census has declined again, standing at about 600 for Vrachasi and 458 for Latsida in 1981. This has much to do with decline of extensive agriculture, the traditional mainstay of both communities. However, population decline in this region is not a new or a simple process. There has been periodic abandonment of smaller settlements in the area, and partial nucleation into larger communities, over the last 200 years (Platakis 1972: 100). Inland villages were generally deserted in favour of the coastal plains at Sissi and Malia.

### *Current land cover (Figure 2.2-8)*

The present boundary between cultivation and pasturage on Anavlochos follows the same approximate contour all round the ridge. Few olives reach onto the steep terra rossa-covered areas. The E slopes above c 350m asl and the N ones above c. 330m are entirely covered by grazed garigue, low maquis, and full woodland. On the S, the higher part of the cultivated area (up to 360m asl) is completely dominated by young olives (under 50 years old). Lower down to the S and E (particularly on the valley bottom and above Latsida) are found the oldest olives, up to 100 years old and unirrigated. This zone of traditionally-established olive cultivation (on the light, loose-textured phyllite-derived soils of D6 type) contrasts with the limited extent of olives above c. 15-30 years old on the terra rossas on the N side of the ridge, the latest area of expansion. There are some gardens and smallholdings around Vrachasi with a mixture of fruit and vegetable crops, irrigated olives and mixed livestock. Well-established fig, plum and walnut trees are located close to the village in several areas.

Carob was an important crop here in the past. Large areas of excultivated carob/olive maquis, with trees about 80-100+ years old, are located on the lower E slopes and the higher SE slopes of the ridge. These old plantations are on the margin of the rocky and thin D1 type terra rossas, contrasting with the main areas of long-established olive cultivation. The denseness of the present vegetation indicates that the terra rossas are capable of supporting at least a medium-height maquis cover post-cultivation and in the presence of grazing. Maquis also appears on some of the very steep rocky N slopes of Anavlochos, which have probably never been cultivated<sup>12</sup>, and in the saddle of the site itself, where it is taking over terraces once

<sup>12</sup> The long-term presence of grazed garigue and maquis in the Vrachasi area is suggested by Platakis on the basis of local toponyms: Karapidia (from wild pear), Katsoprini (from prickly oak); and

used for grain. Most other excultivated areas on the summit and slopes of Anavlochos are now covered by grazed garigue. It appears that since the abandonment of cultivation 30-50 years ago, they have been consistently grazed - never allowed to 'escape' beyond low shrub level. Areas of grazed ex-grain terracing immediately N of Vrachasi village (001, 003) show very few remnants of the almond trees said also to have been cultivated there 30-40 years ago.

### *Cultural features and past land-use (Figure 2.2-9)*

The large nucleations at Vrachasi and Latsida traditionally exploited the surrounding lands through a fieldhouse system. The remains of *metochi* groups and single fieldhouse units are numerous in the region, with its historical emphasis on olive, carob and nut production, which all involve intensive seasonal labour. Topographically, the bulk of the ridge blocks easy access between Vrachasi and the lands to its N, explaining the location of several *metochia* there. Most are at least 50-100 years old (e.g. 030-035 and 105-106, see **Plate 15**), and some are said to date from the Turkish period. This area has traditionally been used by Vrachasi inhabitants, but many *metochia* have seen changes of owner residence, (although many owners still live in the wider region; e.g. Neapolis, the Potamoi valley area).<sup>13</sup> Some are still in seasonal use today: however, the exact nature and location of their use has changed, from farmhouses occupied for a longer part of the year and associated with mixed cultivation, to non-residential use during the period of the olive harvest only. *Alonia* and broad terraces like those associated with *metochi* group 105-106 indicate the past cultivation of cereals or pulses, not found at all in the area today.<sup>14</sup> In the case of 030-035, dwelling structures were associated with kalderimia, field boundary walls, and enclosures, representing a sizeable broad-based smallholding. This complex appears to date from at least 100 years ago (**Plate 16**). The lack of spring-water supplies at the *metochia* necessitated in several cases the construction of cisterns for the collection of rainwater (e.g. 034 associated with 032, 124 associated with 123).

I have already mentioned the extent of relict terracing on the slopes of Anavlochos. The terraces mostly seem to have been for cereals, but small amounts of vines were also grown. Terraced areas which have been abandoned to grazing and not re-used for agriculture are

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Kentouklas, arguably from the local name for *Astragalus creticus*, a common garigue shrub (Platakis 1971: 98-99). The toponyms Axilakolago and Alezi Axilakas, derived from the word axilakas/azilakas (holm oak) also signify a degree of wild tree cover in the area in the past.

<sup>13</sup> See section on Tapes, below.

<sup>14</sup> In this case, olives of up to 70 years old all around the features show the probable earliest date of the cereals decline.

mostly those on limestone terra rossas, while ex-grain terraces on phyllite soils have often been planted with olives in the last 50 years (e.g. 012, 048 and 071).

The windmill remains at 028 (**Plate 17**) may be those mentioned by Fabreguettes in 1835 (Karavalaki 1987:5-6). They seem traditionally to have been used by both Latsida and Vrachasi. Vrachasi also had windmills on the NE edge of the village, and two watermills in the valley to the S must also have belonged to the settlement (067 and 075). There are more mills at the easternmost end of Anavlochos, near Selinari. All these mills, now abandoned, were last in use about 30-50 years ago or even more recently; the watermills must mostly have been used in winter, since the stream beds are dry or reduced in summer. The number of mills supports the other evidence that cereal cultivation was once a significant part of land-use here. However, the generally small number of *alonia* in the region suggests that the mills may also have served other settlements (e.g. some of those mentioned by Platakis 1972). A cluster of *alonia* SW of Vrachasi (008, 010, 046) probably formed the village's main processing area, located close to broad grain terraces on D6 soils (012, 048). The presence of *alonia* and mills in separate groupings to N and S of the ridge shows that processing of cereals took place as close as possible to the area of production.

Past cultivation of vines in the area is indicated by the presence of *patitiria* - built-in wine presses - in many of the old houses in Vrachasi. Despite this, local information and historical research suggest that wine and raisin production was never a very important part of the economy.

Herding (especially on the steep and rocky slopes of Selenas) has long played a significant role in this region. Past grazing of the higher slopes of Anavlochos, too, is testified to by a few stone-built enclosures or small pens (e.g. 017, 018, 054), sometimes on their own, sometimes part of a *mandra/mitato* complex. Some of these may be more recent than adjacent cultivation traces, but the two forms of exploitation certainly co-existed in the form of smallholdings in the last 50 years (e.g. 007 associated with the fieldhouse and terraces 006, 014). The *metochi* holdings N of Anavlochos, now taken over by olive cultivation, are also likely to have included grazing animals. Current grazing on Anavlochos is specialised and extensive: the ridge is used as a grazing 'block' by a large herd based elsewhere.

Lastly, a particular feature of the top of the Anavlochos ridge are the lime-kilns, circular stone-built structures 2-3m in diameter, dating in the last 50-100 years (027, 053). Like the huge quarries on the middle slopes of the ridge, these reflect the usefulness to man of the easily-cut white limestone occurring in the local geology. The stone is now a major component in cement manufacture.

Documentary information on past land-use

Records of the 16th and 17th centuries indicate the most important contemporary crops in the West Mirabello region (Zervoyianni 1983). Almond and carob are frequently mentioned; barley/wheat and pulses were grown in substantial quantities. This shows a substantial contrast with today’s dominance of olive, although olive was cultivated at this time as well. Vines were also grown, although records show that they were never very important here (Nouchaki 1903: 103; Zervoyianni 1983: 100-1). By the 1830s, Fabreguettes remarked on the admixture of other cultivated trees - almond, plum and carob - with olive in the Latsida area, and this seems from my observations also to have applied in the vicinity of Vrachasi in the 19th/early 20th centuries (Karavalaki 1987: 5-6). Spanakis notes the historical reputation of Milatos as the port of Vrachasi, exporting local olive oil and carobs in the 1830s-40s; Nouchaki records the same exports, as well as almonds, from nearby Sissi in the early 20th century (Nouchaki 1903: 103; Spanakis 1991: 715). Byzantinou lists the main products of the region as including oil, almonds, carob and dairy products (Byzantinou 1842: 48).

Soils (Figure 2.2-7)

D7, a combination soil formed from hard limestone weathering products eroded downslope onto *in situ* products of the phyllite-quartzite, appears to have the highest overall CEC (through its high calcium content). This soil is very limited in extent. The CEC values of other soil types in the region are similar to each other, with the D6 type having one of the highest (calcium) carbonate contents (25%). The similar chemical fertility between the hard limestone-derived terra rossas of the ridge (D1, D10) and the phyllite weathering products in the valley shows that the historical and present favouring of the valley for cultivation is based on other attributes - shelter, gradient, looseness/homogeneity and depth. Yet despite their detractions in these respects, the evidence shows that the terra rossas were capable of and used for cultivation historically, constituting a definite source of second-class arable.

Table 2.2-5 Soil codes and descriptions for the Vrachasi Anavlochos area<sup>15</sup> (Figure 2.2-7)

Code	Munsell colour	Description
D1	7.5 YR 5/3	Sandy silt. Terra rossa derived from hard limestone, transported. Frequent inclusions of angular fragments of limestone up to 0.2m in diameter.

<sup>15</sup> See Appendix 1 for detailed horizon description and analysis of a soil sample (D6 type) from this area.

D2	10 YR 5/2	Sandy silt with loose texture. Inclusions of angular fragments of limestone up to 0.5m in diameter. Localised on the saddle and slopes around the main EIA site on the summit of Anavlochos. Represents archaeological material mixed with terra rossa D1.
D3	7.5YR 5/2	Sandy silt. Loose form of terra rossa over soft limestone. Formed from weathering products of this rock, overlain by those derived from nearby outcrops/slopewash of hard limestone.
D4		Sand/gravel. Pure weathering products of marbly limestone, with a gravel-like texture. Incorporates some weathering products of hard grey limestone.
D6	10 YR 5/1	Clayey silt derived <i>in situ</i> from phyllite, with frequent angular inclusions of phyllite up to 0.15m in diameter. Loose, deep deposits (2m+). Occurs on the lowermost slopes of Anavlochos, towards the valley floors.
D6(1)		Clayey silt. No perceptible variation in soil quality from D6, but derived from beds within the phyllite of a very light brown, finely layered and with a clayey, silty texture when crumbled.
D7	10YR 5/2	Sandy silt. Terra rossa derived <i>in situ</i> from quartz-rich elements in the micritic series of limestones in this locality, overlaid by transported weathering products of hard limestones. Frequent angular fragments of quartz up to 0.05m diameter.
D10	7.5Y 6/2	Sandy silt. Possible 'red beds' of Pleistocene date? Silty sand with very frequent angular inclusions of hard limestone (up to 0.2m diameter) and 'pockets', up to 0.7m in thickness, of pure hard limestone fragments (angular, up to 0.5m in diameter).



**Table 2.2-6** Chemical characterisations of soils in the Vrachasi Anavlochos area

Soil code	Percentage of 1-hour range	Carbonate (%)	pH	K (m.e.)	Na (m.e.)	Ca (m.e.)	Mg (m.e.)	CEC (m.e)
Rock	2.35	not tested						
D1	48.5	2	7.33	2.24	0.28	57.63	8.35	68.5
D2	0.84	8	7.47	0.64	0.32	54.20	2.83	57.99
D3	3.85	14	7.26	0.61	0.30	50.40	13.25	64.56
D4	0.96	80	7.73	0.14	0.15	73.97	93.13	167.39
D6	41.8	25	7.04	1.21	0.32	63.70	5.40	70.63
D7	0.96	8	7.36	0.39	0.18	113.27	15.10	128.94
D10	0.7		7.74	0.37	0.54	152.07	2.58	155.56

**Table 2.2-7 (Figure 2.2-10)**

*Land potential calculations for the 1-hour range of Vrachasi Anavlochos*

Total 1-hour range	1300 ha
Total area of 1st-class arable	506 ha
Total area of 2nd-class arable	315 ha
Total area of probable 2nd-class arable (%)	106 ha
Combined probable and certain 2nd-class arable	421 ha
Very poor/uncultivable	342.5 ha
Rock	30.5 ha

**Table 2.2-8***Carrying capacity calculations for the 1-hour range of Vrachasi Anavlochos*

<i>Description (ha)</i>	<i>Quantity</i>
Total area/animals grazed	1300 ha
Prime + 2nd-class arable + (prob. 2nd-class arable x 0.5)	874 ha
Prime + 2nd-class arable	821 ha
Prime + (2nd-class arable x 0.5)	663.5 ha
Prime + (2nd-class and prob. 2nd-class arable x 0.5)	716.5 ha
No. of individuals on 100% cereals, annual fallow	728 or 684 or 553 or 597
No. of individuals on 100% animals	17 or 16 or 13 or 14 (26)
Total no. of individuals able to be supported	745 (754) or 700 (710) or 566 (579) or 611 (623)
40% of total	298 (302) or 280 (284) or 226 (232) or 244 (249)
Estimated size of the LM IIIC-PG settlement (minimum)	15000 sq m
Estimated population of the LM IIIC-PG settlement (minimum)	c. 313 - 375

*Conclusions*

We cannot securely estimate the population of Anavlochos in LM IIIC-SM using the spread of surface pottery, because of the density of later material. The site in the LM IIIC period was probably not smaller than 10-15 000 sq m - i.e. about 300 people.<sup>16</sup> Even with only 40% of the total prime and second-class arable under cultivation, the population of this size of settlement could have been supported within the 1-hour range. Carrying capacity within this range is relatively high in comparison with most of the other sites studied here. I shall discuss later the likely relationship between hinterland potential and the continuity and expansion of settlement at the site in the post PG period. We should, however, bear in mind the possibility of encroachment on the hinterland by the settlements at Neapoli Kastri to the S (until PG), and at Dreros and Milatos to the SE and NE (throughout the settlement's lifespan). As the latter settlements expanded through PG-A it is likely that pressure on resources increased.

It is clearly much more awkward to access the prime arable areas from the EIA settlement than from the historical/traditional ones nearby. There is thus no obvious subsistence reason to use the ridge top for settlement: instead the topography of the site and its fortification wall point to defensibility as the main consideration. Significantly, given the continuity of

<sup>16</sup> I do not want to exclude the possibility of a much larger LM IIIC size.

occupation through the EIA and into the later Iron Age, there is considerable room for expansion of the settlement on the same site.

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### CASE STUDY 3 Kritsa Castello

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In the Lasithi *nomos*. Nearest village: Kritsa

Map sources: Greek Army Geographical Department 1: 50000 topographical map, *Ayios Nikolaos* Sheet 9634/3 (here labelled III). Institute of Geology and Mineral Exploitation, 1972, 1: 50 000 Geological Map: *Mirabello* Sheet

**Figures 2.1-2, 2.2-11-15, Tables 2.2-9-12, Plates 18-24**

This site, first occupied in early LM IIIC and abandoned by the end of SM, lies above and W of the village of Kritsa (**Figure 2.2-11**). Castello (590 m asl), a hill of hard Cretaceous limestone with sheer cliffs to north, east and south, has good defensible characteristics, although its western side, where a saddle joins it to higher slopes behind, had to be protected with a fortification wall during the period of occupation (Nowicki 1992a: 194-5; 200; 1992b: 66-68; 2000: 120-3; see **Plate 18**). Despite this weak point, the site's location and height give it a huge defensible advantage. From it, most of the southern sweep of the Bay of Mirabello across to the northern Ierapetra isthmus can be seen. This, incidentally, allows clear views of contemporary sites at Lato, Vrokastro and Elounda Oxa as well as all approaches from the sea.<sup>17</sup> To the W the higher mountains cut off the view relatively quickly, but even so, visual communication is possible with two contemporary sites at Tapes (see below). The settlement belongs to the largest size class of LM IIIC defensible sites. The nearest contemporary settlement appears to have been at Lato (3.5 km to the NE), where excavated occupation layers go from Archaic through Hellenistic, but where there is, according to Nowicki, surface pottery dating as early as LM IIIC-PG (Demargne 1901; Demerle 1931; Ducrey and Picard 1969, 1970; Hadjimichali 1971; Nowicki 2000: 119).

Kastello forms part of the eastern foothills of the Lasithi range, which in this area have scarps of hard grey limestone on their eastern side penetrated by small gorges running west-east. The gorges hold winter watercourses which drain onto the flat *kampos* (plain) below to the east. This covers c. 5 square km, surrounded on three sides by low hills of flysch (incorporating shales and sandstones) and soft limestone. A spring occurs at about 340-350m asl on the E slopes below Castello. As at Vrachasi, the site of the modern and traditional

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<sup>17</sup> For the latter site see Nowicki 2000: 173-4.

village seems to reflect the long-term importance of the spring. No water runs in the river beds during summer, partly a result of the amount drawn off for irrigation on the *kampos* and surrounding area.

A bright red terra rossa derived from hard limestone (D1; see **Figure 2.2-12**) dominates the area above c. 340m asl, that is, almost all of Kritsa's hinterland to the W. Its thickness and the quantity and size of its inclusions depend largely on the angle of slope. Below the limits of this soil are found those derived from the soft limestone and shale/sandstone flysch (E3, E2). They incorporate (in varying quantities) some weathering products of the hard limestone, transported from the heights above. On the low hills of to the north and south of the *kampos*, the admixture of weathered limestone products is negligible, and the soils take on more characteristics of the underlying geology (E12, E21). The *kampos* is formed by deep (up 2m+) mixed colluvial and alluvial deposits (E10, E4/E8).

### *Settlement history*

There is still much to be learned about prehistoric settlement in this area. EM-MM I sherds have been noted by Nowicki on Castello itself (Nowicki 2000: 121). A series of so-called 'forts' - single buildings positioned along the natural routes leading from Kritsa west through the Lasithi Mountains towards the Lasithi and Katharo plains - has been dated to MM IIA-B (Evans and Myres 1895; Nowicki 2000: 38; Nowicki pers comm). An LM IIIB settlement may be expected on the Kritsa *kampos*, since tholos tombs of this date were recently found there, not far from the village (Tsipopoulou pers comm), and another group of tombs with material of LM IIIA-C date are known from the area north and west of Castello, along the road to Katharo (Platon 1951: 444-5; Kanta 1980: 134-9). There are a number of LM IIIC settlements in the north-eastern corner of the Lasithi mountains, the closest being the Tapes sites (see below) and Lato.<sup>18</sup> From PG, Lato seems to have nucleated population from the surrounding area as the Kritsa and Tapes settlements were abandoned. It continued to grow in size and importance all the way through to the Hellenistic period.

Few Roman remains have been found in the area, although there is some evidence for Roman occupation at Lato and a 1st-century BC sanctuary high in the Lasithi foothills W of Kritsa (Pendlebury 1939: 376; Sanders 1982: 141). Late Byzantine wall-paintings in the church of Sotiros Christou suggest roots for the settlement in this period if not earlier, and it is first referred to in texts as a village in the mid 14th century (Spanakis 1991: 439-41). It

<sup>18</sup> The presence of LM IIIC-PG material on this site is still controversial. See Nowicki 2000: 119 and references above.

developed through the Venetian period as a cluster of smaller villages/hamlets, and was still perceived as comprising three villages in 1630 by Basilicata.<sup>19</sup> It was always large. The 1671 census shows it with 252 households. By the early 19th century, Pashley records 189 families (Pashley 1837 (II): 321). Population has stayed above 2000 throughout the twentieth century, peaking over 2500 in the 1930s-40s. Although the size of the historical population seems to have been partly linked to the high agricultural productivity of the traditionally-exploited area, the community now has a number of sources of livelihood, of which a very important one is tourism. Kritsa has been successfully marketed as a 'traditional Cretan village', selling all kinds of handcrafted items, for the last 15-20 years.

### *Current land cover (Figure 2.2-13)*

The slopes above the village and below the cliffs to its W support a mixture of almonds, olives and carob trees of different ages, bearing witness to a complex history of land-use. Local interviews indicated a tradition of almond cropping over at least the last two centuries, and though the trees are no longer maintained, their crop is still harvested every year. The ex-cultivated maquis of almond and carob also covers the E summit of Castello itself (**Plate 19**). It was not established whether the terraces it covers here were originally constructed for grain or almond cultivation. In general, almond plantations were concentrated on the E1 terra rossas, above the average chosen limit for olive planting here, c. 500m asl. On the lower slopes east of Plativolo, olives become dominant over almonds. Their young age (mostly below 30 and a maximum 50 years old) suggests that the broad stone-built terraces on which they stand were originally used for grain cultivation. However, the presence of older almonds and some huge old carob trees suggests that this area was always under a combined cropping regime. Recent olive planting is also seen on the lower E-facing slopes below Castello and just above the village.

Kritsa is located on the margin between present-day cultivation and pasture zones and has a long shepherding tradition. The flattish tops of Plativolo and of the massif across the gorge to the N of Castello are covered by low grazed garigue, with an oak maquis covering many of the steeper and rockier slopes around them. Above this altitude, the same vegetation dominates the flanks of the eastern Lasithi mountains. However, large parts of the area referred to by the study (within 1-2 hours' walk of the site and of the modern village) have been terraced and cultivated in the past. For example, an abandoned fieldhouse with animal enclosures,

<sup>19</sup> Author of a gazetteer of Venetian Crete. See Spanakis 1991; Rackham and Moody 1996: 90-102.

associated with a large area of ex-grain terracing covered by garigue and some semi-wild almond trees, lies on the eastern edge of Plativolo (026/028). See **Plate 20**.

The *kampos* and low adjacent hills have finer, deeper and more easily tilled soils than the heights above. The concentration of mixed intensive cultivation here is now in very dramatic contrast to the domination of grazing in the latter area, but the contrast was not always so stark. Land-use in the low-lying area has undergone substantial change in the last 30-50 years. It is presently covered by youngish olives (all irrigated), with scattered areas under garden crops. The dry riverbed and its banks to the north are completely covered by small enclosed gardens. But a high number of *alonia* concentrated roughly along the riverbanks, where there is a slight raise in ground level, and broad stone built terraces associated with them, both suggest the importance of cereal and/or legume crops in the past. Combined land-use is evidenced for the past century and a half by alignments of old olive trees of about this age (now surrounded by much younger olives), sometimes along terrace lines and probably marking former field boundaries (**Plate 21**). Past cultivation of vines on the *kampos* is shown by a number of presses (*patitiria*) (**Plate 22**). Garden crops have been important historically (see 'Documentary information' below).

#### *Cultural features and past land-use (Figure 2.2-14)*

The highest concentration of fieldhouses in the area is above c. 500m asl, on the Plativolo plateau and the slopes above it. Those connected with herding are identifiable by their adjacent animal enclosures (e.g. 017, 031, 026-028). The locations of these complexes show that terra rossas on rocky slopes were traditionally favoured for herding, but that cultivation was also widely practised on them. The short distances between the complexes on Plativolo suggest the area was fairly heavily exploited. There is some evidence of boundary walls (e.g. 036) separating the holdings. Similar herding/cultivation complexes exist in the hills above nearby Tapes (see below) up to an altitude of c. 1000m.

While the number of *alonia* on and around the *kampos* shows that large quantities of cereals historically underwent their initial processing in the area, the final milling into flour was not all carried out in the locality. Remains of only one watermill (150) were recorded, just south of the *kampos*. This is said to have been in use in the last 30 years, although in the winter season only, since the stream bed is dry in summer. Other, wind-powered mills at Limnes, 10 km to the N in the Neapoli valley, were traditionally used to process most of the cereal crops from Kritsa. As one of the largest villages in this part of Crete, Kritsa dominated a large enough hinterland by the Venetian-Turkish periods to allow a spreading-out of subsistence



functions well beyond its immediate hinterland. This spread may also have involved the sharing of use of the prime arable of the Kritsa *kampos* and valley by other nearby settlements, e.g. Limnes itself (see documentary evidence cited below).

The *kampos* and slopes west of the village are scattered with stone-lined wells about 8-10m deep, which traditionally assisted intensive agriculture here. Many are still in use. Water collection has long been important in the area. A large 19th-century or earlier cistern, half built and half cut into bedrock, lies NE of the village on the road towards Lato (162). Another large (Venetian) cistern is located near the N edge of the *kampos* (067; **Plate 23**).

Relict terracing is found on the garigue-covered slopes on Plativolo and above Kastello, often in association with the fieldhouses described above (e.g. 017/016; 026-028/025, 031; 034/033). Many terraces show no signs of past use for tree crops, and were probably for cereals or pulses.

#### *Documentary information on past land-use*

A record of 1696 refers to Kritsa as a location of olive oil production (Stavrinidis 1984-87(G): 184). A document of 1671, which refers to the Lakkonia area (a large valley 5 km NE of Kritsa) as 'of the village of Kritsa' shows the wide range of Kritsa's economic territory at this date (Stavrinidis 1984-87(A): 214).

From at least the 18th century we have documentary evidence for the intensive cultivation of the Kritsa *kampos*. A garden near the village is described by Tournefort: 'Almost every Alley in it was terraced and planted with Orange, Pomegranate, Cypress, and Myrtle-Trees: the Kitchin-garden is full of Apple, Pear, and Apricot-Trees, kept *a la mode de Turkey*; that is, left to themselves, as if they were in a Forest.' (Tournefort 1718: 36). In the 1830s, Fabreguettes described the remains of 'charming gardens' from the Venetian period, containing orange, lemon and pomegranate trees. (There are few if any mixed orchards in the area today). He noted the good economic state of the village, listing among its products oil, almonds, carobs and cheese (Karavalaki 1987:10). Spratt describes the Kritsa valley as one of the most fertile in the region, with perhaps more wild tree cover on the hillsides above the village than there is today: 'The valley is well-cultivated with olive-trees and vineyards, and confined by ridges covered with brush-wood.' (Spratt 1865: 137). He notes the cultivation of olive, mulberry and carob in the general area (Spratt 1865: 110).

#### *Soils (Figure 2.2-12)*

The highest CECs and carbonates for soils in the region are found in the combination soil type on the lower hillslopes, E3, and in the soil immediately adjacent to the seasonal river beds

(E4/E8). These soils are both loose and easily-worked. The transported deposits on and around the *kampos*, like the *in situ* flysch-derived soils there, have slightly higher CECs than the E1 terra rossas on the steeper slopes. These and other attributes including gradient, soil depth and workability, as well as the availability of water in seasonal watercourses and wells, are likely to have favoured the long-term use of this area for cultivation. (The *kampos* soils, by analogy with other studied Cretan soils (see Chapter 2.3) are also likely to have the highest water holding capacity of all soils in the region). However, despite having the poorest fertility in the area and being most difficult to work, the terra rossas on the steep slopes have been cultivated historically, particularly with tree crops.

**Table 2.2-9** Soil codes and descriptions for the Kritsa Kastello area (Figure 2.2-12)

Code	Munsell colour	Description
E1	10 YR 5/3	Sandy silt. Terra rossa derived <i>in situ</i> from hard limestone. Frequent angular inclusions of hard limestone of size up to 0.5m diameter, and occasional smaller frags of quartz.
E2	2.5Y 5/2	Sandy silt with angular inclusions of hard limestone up to about 0.3m diameter. Derived <i>in situ</i> from sandstones/flysch, but incorporating a large component of weathering products from the hard limestone transported from higher slopes. Found near the valley floor.
E3	2.5Y 6/2	Sandy silt. Similar to E2 in appearance. Derived mostly <i>in situ</i> from the bedrock of soft limestone/ sandstone/flysch. Light powdery texture and inclusions similar to those of E2, but dominated by occasional fragments of flysch/soft limestone/sandstone up to 0.15m diameter and few frags of hard limestone of similar size.
E4/E8	7.5 YR 5/3	Clayey silt. Developed <i>in situ</i> from weathering products of a calcareous conglomerate, and from transported weathering products of flysch, soft limestone and hard limestones. Very frequent small inclusions of calcite or limestone pebbles up to 0.05m in diameter
E10	10 YR 5/2	Clayey silt. Sometimes compacted. Mixed colluvium/alluvium derived from transported weathering products of flysch and hard limestone. Variable density of inclusions of weathered rock (mostly hard limestone) which are often rounded and small in size (up to 0.1m), but occasionally larger.
E12/ E21	10 YR 6/3	Silty. Derived predominantly <i>in situ</i> from a shale/sandstone flysch bedrock. Angular inclusions of hard limestone up to 0.3m diameter and frags weathered from the flysch of about the same size.

**Table 2.2 -10** Chemical characterisations of soils in the Kritsa Kastello area<sup>20</sup>

Soil code	Percentage of 1-hour range	pH	Carbonate (%)	K (m.e.)	Na (m.e.)	Ca (m.e.)	Mg (m.e.)	CEC (m.e.)
Rock	3.0	not tested						
E1	62.2	7.15	0	1.93	0.34	11.10	1.71	15.08
E2	14.7	6.75	0	0.17	0.22	21.96	2.42	24.77
E3	4.2	7.57	32	0.40	0.57	410.93	2.18	414.08
E4/E8	1.7	7.57	22	0.88	0.78	336.08	4.35	342.09
E10	6.9	7.22	3	2.27	0.37	35.99	3.86	42.49
E12	8.3	7.09	0	0.42	0.39	14.79	1.22	16.82
E12		6.59	2	0.25	0.13	31.19	1.46	33.03
E12		7.62	14	0.13	0.32	not tested	2.17	

**Table 2.2-11 (see Figure 2.2-15)**

*Land potential calculations for the 1-hour range of Kritsa Kastello*

Total 1-hour range	1262.5 ha
Total area of 1st-class arable	421.5 ha
Total area of 2nd-class arable	317.5 ha
Total area of probable 2nd-class arable	407.5 ha
Combined probable and certain 2nd-class arable	736.5 ha
Very poor/uncultivable	89.5 ha
Rock	26.5 ha

<sup>20</sup> See Appendix 1 for detailed horizon description and analysis of several soil types from this area.

Note (particularly with regard to the E4/E8 and E10 soil types) that historical and modern intensive cultivation on the *kampos* have transformed its chemical fertility through the regular use of fertilisers, making it even more difficult to reconstruct its fertility in the EIA.

**Table 2.2-12***Carrying capacity calculations for the 1-hour range of Kritsa Kastello*

<i>Description</i>	<i>Quantity</i>
Total area	1263 ha/animals grazed
Prime + 2nd-class arable + (prob. 2nd-class arable x 0.5)	942.8 ha
Prime + 2nd-class arable	739 ha
Prime + (2nd-class arable x 0.5)	580.3
Prime + (2nd-class and prob. 2nd-class arable x 0.5)	784
No. of individuals on 100% cereals, annual fallow	786 or 616 or 484 or 653
No. of individuals on 100% animals (minimum)	19 or 15 or 12 or 16 (25)
Total no of individuals able to be supported	805 (811) or 631 (641) or 496 (509) or 669 (678)
40% of total	322 (324) or 252 (256) or 198 (204) or 268 (271)
Estimated size of the settlement	c. 30 000 sq m
Estimated population of the settlement (minimum)	c. 625-750

### *Conclusions*

Estimating the size of the Kastello settlement at c. 30 000 sq m, we can suggest a minimum population of c. 750 people, requiring an arable hinterland of at least 900 ha. The large historical population of Kritsa gives a idea of the high carrying capacity of its hinterland (almost identical to that of the Kastello site) under a mixed regime. The subsistence needs of the population could be even be met within the 1-hour range, but only assuming that every piece of prime and all second-class arable, plus a proportion of probable second-class arable, was used. It seems reasonable to suggest that use was made of land outside this range - perhaps the further eastern extent of the *kampos* area, or the higher second-class/uncultivable slopes to the W. If the latter, extensive terracing would be needed for cultivation, or they might have been used for herding. The presence of a settlement at Lato may have constrained use of the high-quality arable to the N and E of the 1-hour range.

As in the case of Vrachasi, we see the historical nucleated village located with good access to the main prime arable area and just slightly above it, probably to avoid land wastage. Although the LM IIIC settlement is immediately above the village, and they have a very similar hinterland, the difference in location is striking from the point of view of defensibility. Steep cliffs isolate the Kastello on all sides except the W. Yet access to the prime arable from here was almost as quick as from the traditional village - direct access to the *kampos* is actually

possible down parts of the cliffs to the E<sup>21</sup> or a longer (c. 20-minute) trip can be made from the W.

The desertion of Kastello from PG may seem difficult to explain in the context of contemporary nucleation elsewhere in Crete, given the room for expansion on the site and its large arable catchment. However, Lato, while having both these characteristics, also had better topographical accessibility and a better view of the seaward approaches and Lakkonía area - i.e. the ability to dominate a larger political and economic territory (**Plate 24**). This example of PG-A settlement development is further discussed in Part 4.

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#### **CASE STUDY 4 Tapes Epáno Kastello, Kato Kastello (and Charakas)**

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In the Lasithi *nomos*. Nearest village: Tapes

Map sources: Greek Army Geographical Department, 1:5000 topographical maps, *Ayios Nikolaos* Sheets 9624/6 (here labelled IX), 9623/8 (VIII), 9633/2 (VII), 9634/1 (VI). Institute of Geology and Mineral Exploitation, 1972, 1:50 000 Geological Map: *Ayios Nikolaos* Sheet **Figures 2.2-2; 2.2-16-21, Tables 2.2-13-16, Plates 25-32**

The sites represent LM IIIC-PG settlement at c. 800-1100 m asl, of which there are relatively few examples. The recording and proper dating was first made by Nowicki, although the existence of a site on Epáno Kastello was already known (Nowicki 1988: 194-5; Nowicki 2000: 123-7). No further archaeological investigation had been carried out in the area until the present study was undertaken. Kato and Epáno Kastello (780m and 1110m asl) are rocky knolls atop a high ridge of Cretaceous limestone in the north-eastern Lasithi mountains (**Figure 2.2-16; Plate 25**). The ridge slopes steeply down on the north to the Potamoi valley, a natural route leading westward into the Lasithi mountains from the Neapoli area. To the S of the Kastellos lies a narrow NW-SE-running valley where the village of Tapes is located (c. 530-560m asl). The Potamoi valley has several LM IIIC sites along its course (Adrianos Fortetsa, Drasi Xeli, Zenia Kastrokefala).<sup>22</sup> Although defensible, these do not occupy good vantage points, being hidden in the depths of the valley. The Tapes sites have different topographical characteristics. They are both highly visible from a distance and intrinsically defensible, by virtue of steep cliffs surrounding their summits. They command an excellent view over a large

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<sup>21</sup> This route is extremely difficult to ascend, and people trying to use it in this way could be easily prevented from doing so by those already on the cliff-top.

<sup>22</sup> Nowicki 2000: 110-7.



area of lower-lying land and the sea to the E, as well as the valleys to the N and S. Only to the W do the higher Lasithi mountains block long-range visibility.

The Tapes valley contains a seasonal stream and several small springs. Low hills of hard limestone with terra rossa soils (type G2; see **Figure 2.2-17; Table 2.2-13**) run S and E from it to the large plain of Lakkonia, 5 km from Tapes. The valley itself, though bounded by hard limestone hills, has soils derived from phyllitic flysch and soft limestone (G6, G3) exposed along its sides and bottom. The flysch weathering products are often overlain by those derived from the hard limestone, forming a particular soil type (G2/G3). Some exposure of phyllites occurs on the saddle and slopes immediately below Epano Kastello to its E and on the steep slopes NW of it. W and S of Epano Kastello are steep, broad and rocky gullies, some filled with limestone scree. A large spring is located in the 'Chalasa' scree W of Epano Kastello, and another on the N slopes of Epano Kastello at about 900m asl. There are several springs in the Tapes valley.

### *Settlement history*

Neolithic settlements have not yet been recorded in this area. There are traces of Middle Minoan occupation on both Kato Kastello (EM III/MM I-II) and Epano Kastello (MM I-II)<sup>23</sup> and on a rocky knoll at Charakas in the upper Tapes valley (Nowicki 2000:123-7; 220). An LM III A-B settlement may be expected in the vicinity of Kritsa, as described above. Nowicki notes LM I-III settlement evidence from the Lakkonia valley (Nowicki pers comm). The LM IIIC period sees numerous small settlements in the region, including the sites in the Potamoi valley, and at Kritsa Kastello. Nowicki also identifies material of this date at Charakas. A small LM IIIC site at Drasi Xeli, on the N side of the Potamoi valley, continued through PG-G (**Figure 2.1-2**). Lato must have exploited the whole Lakkonia valley, and eventually the Tapes area, in the PG-H period. Little is known of the area during the Roman and Byzantine periods.

A settlement at Tapes appears in the Venetian records; it had 107 inhabitants in 1583 (Spanakis 1991: 755). Nouchaki notes that the village was a conglomeration of the settlements Koutsolidon, Thrapsanotidon, and Ayios Yiorgos (Nouchaki 1903: 94). It seems to have stayed small, at around 100 people, during most of the Venetian and Turkish periods. In the early 20th century population was as high as 224, and is now around 160. A small settlement (about 8 houses) existed at Palaio (Old) Tapes, 1.25 km SE of the village, from at least the late

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<sup>23</sup> Nowicki notes that although it has been suggested that the sherds here represent a peak sanctuary, rather than an MM settlement, no positive evidence for the former function has been retrieved.

18th/early 19th century. This was in use year-round. It now functions as a *metochi* associated with olive cultivation.<sup>24</sup>

#### *Current land cover (Figure 2.2-18)*

Herding is currently important in the area, and all the terra rossa-covered slopes surrounding the village above c. 600 m are covered by a grazed garigue. However, there are signs of the previous extension of agriculture onto a comparatively high proportion of the second-class arable now abandoned to grazing.

In the lower valley and around the village, olives up to 50-70 years old are presently cultivated. To the S and E of Kato Tapes, where the valley broadens out, are a large number of young olives (30-40 years old). These areas were previously used for cereals and vines, along with a limited number of olives. Older olives are concentrated on the low hills E of the village. Above them, and on the lower S and E slopes of Kato Castello, a mixed wild/excultivated vegetation dominates. It includes typical species of grazed garigue/low maquis, such as lentisk, thorny burnet and sage, interspersed with wild and semi-wild olive and carob, indicating cultivation of these species here up to about 40 years ago (**Plate 26**). The area is now lightly grazed.

NE of Kato Castello, where broad, rather rocky shelves of land overlook the Potamoi valley, there are large expanses of grazed garigue and maquis. The steep northern slopes of Epáno Castello are also covered with heavily-grazed garigue. Towards the floor of the Potamoi valley, around Adrianos, are numerous excultivated apple and pear trees. 50-100 year old olives are seen close to Adrianos village, with younger trees extending up the slopes to about 600m asl. New olive planting is not so common in this area as a whole as in some of the other regions studied. This largely arises from altitude restrictions (c. 45% of the studied area is above 700m asl). But there is actually a certain amount of evidence for decline in *olive*, as well as cereal/vine cultivation, in favour of herding in the last 50 years (cf. the excultivated maquis described above).

Vegetation cover in the zone above c. 700m asl tells us much about the potential of the G1 type soils over hard limestone, which characterise much of this area. Though loose and highly erodible, they support full oak maquis on the steep slopes NW of Epáno Castello. The rest of the slopes round Epáno Castello have exactly the same soil type, but nearly all bear visible traces of cultivation in the past and of current heavy grazing, leading to their present barren appearance (**Plate 28**). The soils of the Tapes valley bottom are too limited in extent

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<sup>24</sup> For people who live not in Tapes, but in other parts of the region.

ever to have been the only or main cultivated ones, although evidence shows that they have been intensively exploited historically. The use of the steep *terra rossas* for agriculture on a fairly large scale, often in combination with herding, must always have been necessary for settlement in the area.

### *Cultural features (Figure 2.2-19)*

The number of *mandra/mitato* complexes, abandoned in the last 30-50 years but established much earlier, on the high slopes around Epano Kastello bears testimony to the region's shepherding history. Most of these are visibly associated with cultivation remains - terraces and in some cases *alonia* (e.g. 026/027, 032/031, 040/041, 080-083/085, 065-075, 087-089/090; see **Figures 2.2-19-20; Plate 29**). They are found at heights up to 900m asl. *Mandra* enclosures used for milking/shearing are found in all the complexes, together with one or two *mitato* structures used for accommodation and cheese preparation. The complexes are similar to those on the higher land around Kritsa, which also have remains associated with cereal/vine cultivation. The past combination of herding and cultivation up to around 900-1000m is important in illustrating the second-class arable potential of this land.

Despite the presence of nearby springs, two deep cisterns (078 and 079) in the area of the *mandra/mitato* complexes indicate that the need was felt to store either spring- or rainwater in large quantities. Provision of these storage facilities is likely to reflect the relative density of past seasonal occupation on these high slopes. Cisterns are still in use today at a modern *mandra* at the head of the Tapes valley, near Kato Kastello (009 and 057, associated with 011). Another example of a complex similar to those just described is located on a low hill north of Kato Kastello (080-085). It includes a large cultivation enclosure, relict terraces and animal pens with residential/working structures. The area now presents a very barren appearance, being given over to grazing, but during the period of use of the complex (in the last 30-50 years) there were clearly extensive areas of cultivation.

Pocket terraces with older olives (e.g. 052, 053 056) exist around Tapes village and close to the valley bottom, and others on the lower S slopes of Kato Kastello bear witness to the cultivated origin of the maquis there (see above; **Plate 30**). The broad terraces on the Tapes valley floor and low southern hills were said to have supported a mixture of vines, almonds and cereals 30-50 years ago (**Plate 31**). Of these crops, only some almonds remain, now standing alongside recently-planted irrigated olives. *Alonia* are found in the valley, and wine-presses in some of the abandoned houses in Ano Tapes. Cereal cultivation in the area was never so extensive that Tapes needed its own wind- or water-mill, and milling was traditionally carried

out in the Lakkonia area. There are several long walls on the slopes around the village (e.g. 013, 017, 054, 091; see **Plate 31**). These indicate former localised boundaries between grazing and cultivated land. The short wall 054 was probably a property boundary. The walls confirm the past intensive use of the valley floor and adjacent areas for cultivation in a grazing-heavy environment. The walls visible on the high slopes around Epano Kastello, associated with terraces there (e.g. 025; **Plate 32**), must have defined small-scale property/land-use boundaries. In this locality grazing was the dominant land user, but these boundaries show the importance of cultivation in the same zone.

### *Soils (Figure 2.2-17)*

The highest CEC is found in the G6 soil type, the *in situ* weathering products of flysch found on the floor and lower sides of the Tapes valley. This soil contains some hard limestone products eroded down from the slopes above. A high CEC was also found for the combination type soil G2/G3. As well as being the most sheltered, these soil types are also the loosest and most workable in the area. It is almost certainly for these reasons that cultivation has long been, and is still, focused on this zone. However, the rocky terra rossas on the steeper slopes (G2) have a reasonably high fertility for soils of their type, and have seen fairly large-scale cultivation historically, probably because the valley-bottom soils were not extensive enough for subsistence needs.

**Table 2.2-13** Soil codes and descriptions for the Tapes area (Figure 2.2-17)

Type	Munsell colour	Description
G2	7.5YR 5/3	Sandy silt. Compact, sometimes indurated. Terra rossa, derived <i>in situ</i> from hard limestone. Frequent inclusions of frags of hard limestone up to c. 0.2m+ in diameter.
G2/G3	10 YR 6/3	Sandy silt. Derived from both <i>in situ</i> and transported weathering products, often with two identifiable horizons. The upper has many weathering products of hard limestone with angular inclusions up to c. 0.2m in diameter. The lower horizons bear more relationship to the soft limestone/flysch bedrock, with fewer, smaller, angular inclusions of hard limestone and occasional inclusions of phyllite up to c. 0.15m in diameter.
G3	10 YR 5/2	Sandy silt. Derived largely or wholly <i>in situ</i> from the weathering products of limestone/sandstone flysch. Light, powdery texture. Frequent inclusions of soft limestone/sandstone frags up to c. 0.1m in diameter.
G4	10 YR 4/2	<i>In situ</i> loose, coarse weathering products of phyllite, not forming a soil.
G6	10 YR 6/3	Sandy silt. Derived <i>in situ</i> from phyllitic flysch. Occasional semi-angular inclusions of phyllite less than c. 0.15m diameter. Few inclusions (transported) of hard grey limestone, up to c. 0.1m diameter.

**Table 2.2-14** Chemical characterisations of soils in the Tapes area

Soil code	Percentage of 1-hour range	pH	Carbonate (%)	K (m. e.)	Na (m. e.)	Ca (m. e.)	Mg (m. e.)	CEC (m. e.)
Rock	6.15	not tested						
G2	77.1	7.66	2	0.37	0.31	45.72	1.84	48.24
G2/G3	5.5	7.52	32	0.23	0.38	320.61	1.98	323.20
G3	2.72	7.41	2	0.13	0.24	9.79	1.57	11.73
G4	0.09	not tested						
G6	7.3	7.01	3	2.00	0.18	323.60	2.03	328.81

**Table 2.2-15 (Figure 2.2-21)**

*Land potential calculations for the 1-hour range of Tapes Epano and Kato Kastello<sup>25</sup>*

Total territory area	1517.5 ha
Total area of 1st-class arable	231 ha
Total area of 2nd-class arable	484 ha
Total area of probable 2nd-class arable	494.5 ha
Combined probable and certain 2nd -class arable	978.5 ha
Very poor/uncultivable	215 ha
Rock	93.5 ha

**Table 2.2-16**

*Carrying capacity calculations for the 1-hour range of Tapes Epano and Kato Kastello*

Description	Quantity
Total area/animals grazed	1518 ha
Prime + 2nd-class arable + (prob. 2nd-class arable x 0.5)	962.4 ha
Prime + 2nd-class arable	715.2 ha
Prime + (2nd-class arable x 0.5)	473.2 ha
Prime + (2nd-class and prob. 2nd-class arable x 0.5)	720.4 ha
No. of individuals on 100% cereals, annual fallow	802 or 596 or 394 or 600
No. of individuals on 100% animals (minimum)	19 or 14 or 9 or 14 or (30)
Total no. of individuals able to be supported	821 (832) or 610 (626) or 403 (424) or 614 (630)
40% of total	328 (333) or 244 (250) or 161 (170) or 246 (252)
Estimated sizes of the settlements (Nowicki 2000: 123-27) (minimum)	Kato Kastello - c. 22 000 sq m Epano Kastello - c. 1000 sq m
Estimated population for both settlements (minimum)	c. 479 - 575

### Conclusions

A maximum population of c. 575 is suggested here for the two sites.<sup>26</sup> A discrepancy is apparent between this figure and the size of the traditional population of Tapes, the latter rarely

<sup>25</sup> In the case of the Tapes cluster the fieldwork undertook to characterise the 1-hour range of both sites, which includes a substantial overlap, in order to investigate the implications of the cluster relationship, including possibly different functions for the settlements.



rising above 200. To support the larger number of people, all prime arable and all second-class arable, with a proportion of probable second-class arable, in the 1-hour range would have to be used: such intensive land-use is unlikely for any period. Through both cultivation and herding, the settlements would probably exploit a larger land area, perhaps including the W end of the Lakkonía valley.

Although access to prime arable was more difficult at Epano Kastello than Kato Kastello, the immediate hinterland of Epano Kastello did have second-class arable potential. No clear economically functional differentiation can be shown to have existed between the sites. But Epano Kastello is very small, and while there is no reason to suppose it was seasonally occupied, it might well have been an adjunct to the main site at Kato Kastello, used only for a limited occupation span, or on an occasional basis as a defensible refuge. A site whose main/only function was herding would be unlikely to require such an inaccessible position.<sup>27</sup> The hinterlands of the two sites overlap to such an extent that access to land must have had to be shared or otherwise negotiated between them. Their overlap to the N with the 1-hour range of Adrianos Fortetsa (which in turn overlaps with the hinterland of Zenia Kastrokefala) further indicates the need for a high degree of co-operation over land-use in this area.

This case provides an especially dramatic example of differential preferences in the location of historical/traditional and EIA settlement. The EIA sites are very obviously not best-placed for exploitation of the sheltered prime arable in the valleys. The walk from Epano Kastello to the Tapes valley floor is 50 minutes or more. Kato Kastello, while closer, still does not command the prime arable nearly as well as the historical village does. As in the other areas discussed here, EIA settlement priorities were driven by other factors than subsistence. The choice of the Kastellos is likely to have related to their intrinsic and strategic defensible qualities, especially as part of a wider defensible system of settlement. The high visibility of both sites from a great distance around perhaps had a symbolic as well as a defensive value.<sup>28</sup> The abandonment of both sites by PG is likely to relate partly to the inaccessible nature and

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<sup>26</sup> Although estimate of population is carried out on the same basis as elsewhere in this study, Tapes Kato Kastello shows no clear signs of a 'typical' EIA agglomerative plan. The dense scatter of pottery is not associated with dense building remains on what should be a fairly well-preserved site. It contrasts in this respect, for example, with Kritsa Kastello.

<sup>27</sup> Although there are cases of *mandra* complexes in Crete which make use of rocky outcrops as viewpoints. I found one in the Frati area.

<sup>28</sup> For discussion of potential symbolic meanings in EIA settlement locations, see Chapter 3.1.

limited size of their political and arable catchment by comparison with, for example, that of Lato (to where the population may have moved).

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## CASE STUDY 5 Chamaizi Liopetra

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In the Lasithi *nomos*. Nearest villages: Chamaizi, Skopi

Map sources: Greek Army Geographical Department 1:5000 topographical maps, *Siteia* Sheets 9628/5 (here labelled I), 9627/8 (II), 9628/7 (III), 9638/1 (V), 9637/2 (IV). Institute of Geographical and Mineral Exploitation, 1959, 1: 50 000 Geological Map: *Siteia* Sheet

**Figures 2.2-3, 2.2-22-26, Tables 2.2-17-20, Plates 33-44**

The massive headland of Liopetra, 4.5 km N of the village of Chamaizi in the far east of Crete, forms a strikingly defensible site, and its history of use shows that this attribute has been consistently well-recognised (**Plate 33**). The well-preserved remains of a sizeable Venetian fort cover the summit, and artificial fortification of the area can be shown to extend back to the late Byzantine period (Gerola 1905: 88). Pottery of Archaic and Classical date was noted by Faure on the same site, and Nowicki has been able to recognise LM IIIC-PG and G sherds (Faure 1962: 37; Nowicki 2000: 101-2). This was confirmed on visits by the present author (though sherds are limited in number, and the size of the site in any of the ancient periods is difficult to estimate, given the density of later occupation evidence on the surface). The use of the site in the EIA is supported by 'SM'-PG to G material from a number of tholos tombs found in the S part of the valley to its E (with the toponym 'Fatsi') and from nearby Droggara, closer to Skopi village (Davaras 1971, 1972b; Tsipopoulou 1997a).

The site has sheer slopes to the W (where beds of phyllite are intercalated and faulted with the limestone) and to the E, with almost vertical, high cliffs on the N (**Figure 2.2-22**). It is impossible to scale in many places on the N and W sides, and extremely difficult in others. The S slope is by far the most accessible, but it is still a steep (200 m) climb up to the summit from the small enclosed plain (*lakkos*) of Sochores below (**Plate 34**). The limestone/phyllite boundary is exposed on this slope at c. 260-280 m asl.

Two sheltered but very small bays flank the massif of Liopetra immediately to its SW and NE, forming the ends of narrow gorges running from the S. The NE gorge (Charkomatar) broadens at the Sochores *lakkos* and narrows again beyond it to the S to form a valley. The eastern side of this valley is formed by low hills of phyllite and conglomerate. Higher phyllite

hills close it off to the S. The gorge W of Liopetra (called the 'Ayios Ioannis' gorge here)<sup>29</sup> is shorter than the Charkomatar one, and slopes steeply down toward the sea, where it ends in a small piece of alluvium and a beach. The coastline SW and NE of Liopetra contrasts in several respects. On the SW, there is a series of small inlets and beaches with limited flat land behind them, separated by very steep stretches of cliff (**Plate 35**). NE, beyond the Charkomatar gorge, the coastline opens out to the Bay of Faneromeni, with a long stony strand (**Plate 36**). A coarse-grained bright red deposit (S20) runs out to the coast on the E from the Liopetra massif. It derives from the weathering products of hard limestone and was perhaps laid down during the Pleistocene (**Figure 2.2-23**). The whole Liopetra massif is characterised by terra rossas forming *in situ* over the hard limestone (S10, S11). In the Charkomatar valley, mixed phyllite and hard limestone weathering products lie near the valley bottom (S13, S12/S13 soils). The conglomerate produces a sandy, pebbly soil (S17). The marl plateau to the SE (Xerokampos) is characterised by two types of soil - a coarser, transported one containing weathering products of marly limestone and other rocks (S15), and a finer, powdery one formed *in situ* from pure marl (S16).

Seasonal streams in the valleys, which until quite recently flowed year-round, have had some erosive effect and helped to thicken alluvial deposits in the Sochores *lakkos*, the coastal plain and the inlet at Ayios Ioannis. The pottery of all periods found in the stream beds supports this. But Bronze Age sites found on the lower hilltops of phyllite and conglomerate, as well as on the hard limestone of Liopetra, are well-preserved, suggesting limited long-term erosional change in the landscape during the last 5-6000 years.

Springs are found on the lower S slopes of Liopetra, just above the Sochores *lakkos* on the phyllite/limestone unconformity, and in the Ayios Ioannis gorge, where a large spring (Kefalovrisi) once fed a year-round stream. Use of the spring's water for irrigation has substantially lessened its volume in the last 20-30 years, but it is still large. Geological wells and complex pumping systems throughout this area now supply water for intensive agriculture, although the farmers complain there is too little water for their needs.

### *Settlement history*

<sup>29</sup> The use of this toponym may be confusing, since there are two chapels of Ayios Ioannis in the vicinity of the site. The one used to refer to the gorge is situated on the small coastal inlet due SW of Liopetra, the other is NE of the massif on the coast at the end of the Charkomatar gorge (the area on Figure 2.2-22 labelled *Papadios Kampos*).

The fieldwork noted several settlement sites not previously recorded. The earliest evidence found was of Late/Final Neolithic date; a pottery scatter of relatively large size (c. 5-8000 sq m) on the S end of the Xerokampos ridge (079). An EM site (055) was noted on a low hill near the sea at the N end of the Charkomatar valley. Faure mentions a cave with EM sherds, close to the sea below Liopetra (Faure 1962: 37). Two MM I-II sites (047 and 054; the latter continuing into LM I) were located on low hills in the same area.<sup>30</sup> The only recorded LM IIIA/B occupation in the area is a single building adjacent to the well-known MM settlement at Chamaizi (Xanthoudides 1906: 155). More significant LM III settlement might well exist in the region, however.

As elsewhere, it is in the LM IIIC period that the settlement pattern shows the most dramatic shift, to Liopetra. Settlement continued here until the Classical period. The development of smaller satellite site(s) appears to take place from G onwards. A small site of G/A-C date was discovered during the fieldwork on the east side of the Charkomatar gorge (029). Faure recorded C-H pottery at the cave already mentioned, near the end of the Charkomatar valley, and another cave on the SE slopes of Liopetra (Faure 1962: 39). Few traces have been recorded of Roman occupation in the area, though Sanders suggests that the earliest construction of the fortifications on Liopetra may date to the late Roman period (Sanders 1982: 136). Substantial settlement in the area is clearly evidenced by late Byzantine/early Venetian. The fort on Liopetra had a sizeable settlement (097/099) adjacent to it further N on the headland. The fieldwork also found Byz/Venetian sherds close to a cave on the SE slope of Liopetra.

The inland villages at Chamaizi and Skopi were established by the late 16th century (Spanakis 1991: 726; 808-9). In the Venetian and Turkish records the population of Chamaizi was never higher than 400. It is now somewhat lower. Most of the very numerous *metochia* of which the remains cover the landscape were probably in use by the early 19th century, if not earlier. It is not clear exactly when the very dense pattern of holdings distant from the main village and managed through fieldhouses and *metochia* emerged. At the time of the occupation of the main Venetian fort and settlement, it is unlikely that such a dispersed pattern existed. It probably grew up because no permanent settlement was established here in post-Venetian times, although the land was valuable for agriculture and had water supplies. The main villages stayed further inland, close to the main communication routes.

<sup>30</sup>The well-known fortified MM I-III site at Chamaizi, 5.5 km SW of Liopetra, is also on a low hill (Xanthoudides 1906; Davaras 1972b).

Until about 40-50 years ago, the *metochia* were used for a variety of tasks throughout the year – vine, cereal and olive cultivation, as well as small-scale herding – rather than a single seasonal task. Nevertheless, the permanent residence was in the villages – Chamaizi and Skopi. The area is now intensively cropped by people living in these villages and in Siteia. The seasonal residence pattern has diminished almost to nothing with the advent of mechanisation, although some families come and stay out here for weekends (in newly-built structures) as a kind of holiday combined with maintenance of their vineyards and olives.

#### *Current land cover (Figure 2.2-24)*

In the last 40-50 years, much of the area has come under new (irrigated) olive cultivation. The favoured areas are the gentle slopes with phyllite soils, now extensively terraced by bulldozer, at the SE end of the Charkomatar valley. A few areas of older trees (c.60-70 years) can be seen, but these are very limited. A small stand of wild/excultivated olives near the Byzantine-Venetian settlement at ‘Xiroxilo’ on the end of the ridge NE of Liopetra (097/099) shows they were once cultivated there. A small area of excultivated olive maquis covers stone-built terraces (167) on the S-facing slopes of the Xerokampos ridge.

The main areas used historically for vine and cereal/pulse cropping seem to have been the phyllite, marl and conglomerate areas E and S of Liopetra, and the coastal plain. The steep slopes of Liopetra itself, with terra rossa soils, show less evidence for past cultivation. Local interviews indicated that the marl plateau of Xerokampos (‘dry plain’) was so-called because the soils fail to hold water efficiently. However, this area was traditionally used for dry crops, and still has a stretch of cereals. Irrigated olives are now grown there.

Herding in this area is specialised and on a fairly large scale, focused on the garigue-covered Liopetra massif itself, some of the hills to the S, and the Ayios Ioannis valley. A mixed herd of about 300 animals is based year-round on this land, from a large modern *mandra* in the Sochores *lakkos*. The current separation of large grazing and cultivation areas contrasts with the traditional system, where the *metochi* holdings must have used a patchwork of enclosed cultivation areas and fallow/stubble grazing in an integrated system. Land ownership, however, still reflects traditional patterns, and is very fragmented. The present enclosed grazed area represents contiguous blocks rented by the single shepherd in return for cash and produce.

#### *Cultural features (Figure 2.2-25)*

The *metochia* range in size from single, small structures to larger, multi-roomed ones with associated *alonia*, ovens, cisterns and animal enclosures (e.g. 037, 046) as well as larger groupings of dwellings (015, 019, 039, 041, 053): see **Plates 38, 39**. It is likely that each



*metochi* was sited to exploit its own immediate vicinity, though more distant landholdings could have been used too. No *metochia* are associated with large areas of old trees; the predominant activities were cereal/vine/legume/garden cultivation and livestock. Numerous examples with their own *alonia* suggest a strong element of independence of operation. Some clusters of *alonia* are seen, which probably served several holdings (e.g. 135; 162-3).

The largest example of a grouping, abandoned in the last 50 years, is 010 on the lower E slopes of Liopetra. It comprises at least ten houses. Situated on a slight rocky outcrop, it has fairly steep phyllite slopes above and below it - i.e. it is located off the main arable area. It lies near the traditional boundary of holdings between Chamaizi and Skopi (the valley bottom),<sup>31</sup> and is said to have belonged to Skopi. Another cluster is found on a low hill NE of Liopetra (053), with a few more on the adjacent ridge end to the S (046, 048). The total number of *metochia* recorded in the study area was 26 single structures/1-household complexes and 7 groupings, the largest of these probably used by up to 50 people. Although these holdings only represented only part of their owners' subsistence base, and the structures may not all have been used in the same period, the number gives us a very rough idea of the carrying capacity of the 1-hour range of Liopetra, i.e. c. 280 people.

Remains of a watermill were mentioned by locals deep in the Ayios Ioannis gorge SW of Liopetra. The structure was not presently visible due to vegetation growth, although the remains of a typical farmhouse/*metochi* with associated animal pen were found at the spot suggested (117a and b). The mill was said to have been in use up to c.50 years ago. Historically, most final processing of cereals seems to have taken place outside the area.

Terraces, now covered by garigue or by young olives, were used for vines, grain or pulses until at least the mid-20th century. They are on various types of soils, including the pure phyllite hills S of the Charkomatar valley, the marl slopes N of Xerokampos (070, 071, 081), and the N slopes of the Devsi ridge (at the S end of the Charkomatar valley). Terraced areas often correspond to individual *metochia*. On the N slopes of Xerokampos, roughly-built pocket and straight terraces support olive plantations of 50-80 years old (033 (with carob trees), 034, 073, 045), and are likely to have been constructed for this purpose. Garigue-covered terraces at the mouth of the Ayios Ioannis gorge (103, 104), show past cultivation of the small, sheltered patch of alluvium there. Agriculture here dates back at least to Venetian times (from surface material). Some sherds on the terraces are late Roman/early Byzantine, suggesting even earlier use. The land was cultivated until the 1960s, with a *metochi*/farmhouse here in use until that date (102). Part of the same holding, the S side of the gorge has relict terracing going 50 or

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<sup>31</sup>Faure 1962: local sources confirmed this.



60m up the phyllite slopes (111, 115, 116, 119). The lower terraces have a few old olive, carob and fig trees on them, and there is an adjacent *aloni*.

Considering the large number of *metochia*, it is surprising that there are no clearly-marked field/property boundaries.<sup>32</sup> Instead, landmarks such as stream beds, outcrops or cliffs were probably used as boundary indicators. There are a few field walls on Xerokampos (e. g. 014, 017) but these are close together and may simply have separated different parts of the same small holding. There is also a lack of any major built boundary between cultivation and grazing zones, pointing up the role of grazing as traditionally small-scale and integrated in this area.

Historically-limited water supply is behind the presence of cisterns at many *metochia*. Before the advent of intensive olive cultivation there was water year-round in the stream bed W of Ayios Ioannis, and cistern supplies could be supplemented by this. The numerous Venetian cisterns on Liopetra show a need for water storage at that period too (exacerbated by the need to provide self-contained resources at the fort: see **Plate 40**).

Remains of herding enclosures are fairly rare, and are usually associated with the *metochia* (e.g. 053, 117a and b, 128/129, 133. See **Plate 41**). Livestock formed part of the mixed smallholdings, and probably grazed on cultivated stubble in the valleys, as well on the steeper, rockier slopes of Liopetra. A strong contrast is apparent today on the Sochores *lakkos* between the large, specialised modern *mandra* complex and the abandoned *metochia* in the same area which do not seem to have included livestock at all (**Plate 42**). Specialisation owes much to the role of mechanised transport, bringing the shepherd the 7 km by road from his house in Chamaizi every day. Herding of this type is much more profitable and less labour-intensive than the small-scale system at the old *metochia*.

### Soils (**Figure 2.2-23**)

The soils formed by hard limestone weathering products mixed with those of phyllite (S12/S13) were cultivated historically in places. But in the steeper areas, and where these soils give way to rocky terra rossas over hard limestone (S11/S1), cultivation was not very extensive. Calcium content is highest in the soils on hard limestone, pushing up the CEC figure. In contrast, the historically heavily-used pure phyllite soils have low CEC.<sup>33</sup>

<sup>32</sup> However, field walls have been historically rare in most parts of Crete, as the other case studies show.

<sup>33</sup> Where hard limestone products are incorporated with them (S12/S13), a higher CEC is seen.

The marl soils, cited by locals as having poor water retention, proved to have fewer available nutrients than those derived from conglomerate. Yet the latter have been little favoured for cultivation, probably due to their stony character. The marl soils' depth, workability and gentle gradients have made them more favoured historically, and they are still preferred today. Bintliff's study of the Ayiofarango argued that the soils with highest arable potential were formed where a thin marl layer marl overlay phyllite, allowing surface water to be held in the soil (Bintliff 1977b). A similar situation is seen in this area on the slopes W of Xerokampos (S15). However, the thickness of the marl layer here (up to 0.3 m) prevents water from being retained very effectively.

**Table 2.2-17**

*Soil codes and descriptions for the Chamaizi Liopetra area (Figure 2.2-23)*

Code	Munsell colour	Description
S1		Sandy silt. <i>In situ</i> and transported weathering products of phyllite beds in hard limestone cliffs. Loose. Frequent angular inclusions of hard limestone and phyllite frags up to 0.2 m diameter.
S2	2.5Y 6/2	Sandy silt. Transported alluvial/beach deposits derived from hard limestone and phyllite. Frequent inclusions of rounded pebbles of hard limestone up to c. 0.1 m diameter.
S10	10 YR 5/2	Sandy silt. Terra rossa derived <i>in situ</i> from hard limestone, with archaeological material. Loose. Frequent inclusions of angular hard limestone frags up to c. 0.2 m diameter.
S11	10 YR 6/3	As S10, without occupation material. <i>In situ</i> /transported terra rossa derived from hard limestone.
S12/S13	7.5YR 5/3	Sandy silt. Terra rossa derived from phyllite weathering products, incorporating a significant proportion of weathering products of hard limestone. Loose. Frequent angular frags of hard limestone up to c. 0.15 m in diameter; occasional angular frags of phyllite.
S13	10 YR 6/2	Sandy silt. Terra rossa derived <i>in situ</i> from phyllite weathering products. Occasional to frequent inclusions of angular phyllite frags up to c. 0.1 m diameter.
S15	2.5Y 6/2	Sandy silt. Formed from weathering products of soft limestone overlying phyllite weathering products. Loose. Frequent frags of soft limestone up to 0.1 m diameter.
S16	2.5Y 7/2	Clayey silt. <i>In situ</i> weathering products of pure marl and soft limestone. Few inclusions.
S17 (Plates 43, 44)	2.5Y 6/3	Sandy silt. Loose. <i>In situ</i> and transported weathering products of pebbly conglomerate with frequent inclusions of large rounded pebbles of hard limestone up to c. 0.15 m in diameter.
S18	2.5Y 6/2	Sandy silt. Terra rossa derived <i>in situ</i> from phyllite, overlain by transported weathering products of conglomerate. Loose. Occasional inclusions of rounded pebbles of hard limestone up to 0.1m diameter, and frags of phyllite of similar size.
S20	10 YR 6/4	Sandy silt. Transported terra rossas derived from hard limestone (Pleistocene deposits?). Frequent very small inclusions of angular fragments of hard limestone up to c. 0.03m diameter. Loose.

**Table 2.2-18***Chemical characterisations of soils in the Chamaizi Liopetra area<sup>34</sup>*

Soil code	Percentage of 1-hour range	pH	Carbonate (%)	K (m.e.)	Na (m.e.)	Mg (m.e.)	Ca (m.e.)	CEC (m.e.)
Rock	7.5	not tested						
S1	1.3	not tested						
S2	0.3	8.12	2	0.13	3.15	1.51	285.68	290.47
S10	0.5	8.40	37	2.43	1.01	2.67	365.83	371.94
S11	21.4	7.75	17	0.34	1.01	8.61	172.43	182.39
S12/S13	2.5	7.89	4	0.45	1.14	1.98	65.56	69.13
S12/S13		7.23	40	0.09	3.15	4.51	415.23	423.68
S13	44.1	8.09	16	0.1	0.21	1.78	162.80	164.89
S13		7.01	1	0.24	1.01	2.86	15.85	19.96
S13		7.12	2	0.47	1.41	2.86	457.18	461.92
S13		6.26	0	1.02	3.15	2.34	16.87	23.38
S13 (B horizon)		7.65	2	0.2	32.1	1.40	27.28	60.98
S15	10.6	7.50	60	0.42	1.21	3.84	343.38	349.05
S16	3.1	7.94	93	0.08	29.38	6.66	438.04	474.16
S16		7.69	4	0.29	0.32	4.22	392.22	397.05
S17 (A horizon)	5.4	7.72	4	0.2	4.16	6.14	526.46	536.96
S17 (B horizon)		7.84	28	0.13	4.81	6.72	360.78	372.44
S17		7.62	49	0.29	0.48	7.09	11.27	19.13
S18	1.8	7.69	3	0.15	20.55	3.29	334.40	358.39
Chamaizi, Papadios <i>kampos</i>	bordering 1- hour range	7.23	2	1.13	1.88	5.53	11.62	20.16
S20	1.4	7.75	1	not tested	0.32	5.97	17.27	

<sup>34</sup> The large number of soil types in this relatively small area encouraged the testing of more samples in order to better differentiate soil qualities. As reflected in this table and in the analyses reproduced in the Appendix, high variability is often seen within a single soil type, and this fact cautions against too much reliance on such data to evaluate the perceived or actual value of a soil type for cultivation.

**Table 2.2-19 (Figure 2.2-26)**

*Land potential calculations for the 1-hour range of Chamaizi Liopetra*

Total territory area	847.5 ha
Total area of 1st-class arable	370.5 ha
Total area of 2nd-class arable	149.5 ha
Total area of probable 2nd-class arable	135.5 ha
Combined probable and certain 2nd-class arable	285.5 ha
Very poor/uncultivable	191.5 ha
Rock	128.5 ha

**Table 2.2-20**

*Carrying capacity calculations, 1-hour range of Chamaizi Liopetra*

<i>Description</i>	<i>Quantity</i>
Total area/animals grazed	847.8 ha
Prime + 2nd-class arable + (prob. 2nd-class arable x 0.5)	588.1 ha
Prime + 2nd-class arable	520.3 ha
Prime + (2nd-class arable x 0.5)	445.4 ha
Prime + (2nd-class and prob. 2nd-class arable x 0.5)	513.3 ha
No. of individuals on 100% cereals, annual fallow	490 or 434 or 371 or 428
No. of individuals on 100% animals	12 or 10 or 9 or 10 (17)
Total no. of individuals able to be supported	502 (507) or 444 (451) or 380 (388) or 438 (445)
40% of total	201 (203) or 178 (180) or 152 (155) or 175 (178)
Estimated minimum size of the LM IIIC-PG settlement (Nowicki 2000: 102) <sup>35</sup>	15-20 000 sq m
Estimated population of the LM IIIC-PG settlement	c. 313 - 500

<sup>35</sup> Nowicki suggests the size of the site by the G period to have been up to 45 000 sq m. This indicates a fairly large size in the preceding periods too. However, a significant degree of growth during the course of the PG period seems likely, by analogy with other sites of this type (see Part 4).

### Conclusions

The site's location makes it inaccessible from the lower-lying valleys which constitute the main arable in the area - this is reflected in the small size of its 1-hour range. Even within this small range, though, the population could be supported on a mixed farming basis. The easily-worked marl soils would be particularly valuable, and we might expect the subsistence hinterland to extend further onto the Xerokampos area or into the phyllite valleys to the S. Given the lack of nearby contemporary settlements, there would seem to have been few territorial constraints. The location on a partly uncultivable rocky massif would allow herding close to the settlement to contribute easily to the economy (although this would probably require clearance of existing vegetation). The coastal position may have allowed engagement in marine-linked economic activities, including piracy, trade and/or fishing.

Neolithic and Bronze Age settlement used the valleys around Liopetra, while the main historical settlements were based in inland valleys, a considerable distance away from it. The hilltop was occupied in no other period, except one where defence was clearly the paramount consideration (late Byzantine/Venetian). The valuable productive character of the area is clearly evidenced by its long-term use as an extension of cultivated territory through the *metochi* system, even when permanent settlement was elsewhere. Again, however, this exploitation took place from the valleys, not the inaccessible summit of Liopetra. The fact that the Liopetra survived through PG-A is probably due in part to the value of its arable hinterland. But it seems that changing communication priorities, political and economic expansion, and the decline of an overriding concern with defence eventually combined to shift settlement from here by Classical times.

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### CASE STUDY 6 Profitis Elias Rokka and Korifi

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In the Iraklion *nomos*. Nearest village: Profitis Elias

**Map sources:** Geographical Department of the Army 1:5000 topographical maps, *Archanes* Sheets 9529/7(here labelled II), 9528/8(I), 9538/2(IV), and 9539/1(III), Institute of Geographical and Mineral Exploitation, 1972, 1: 50 000 Geological Map: *Archanes* Sheet  
**Figures 2.2-4, 2.2-32-36, Tables 2.2-22-24, Plates 45-55**

EIA occupation on these sites has been little discussed. The vicinity is regularly identified with the ancient Lykastos (referred to by Homer, *Iliad* 6: 47; Strabo X: 479; Polybius III: 370). The proper description of a Bronze-Age-Classical site here, and the attribution of the ancient name



to it, was first made by Mariani (Mariani 1895: 234). Rokka is well-known as the site of a late Byzantine fortress which continued in use into the Venetian period (Taramelli 1899; Marinatos 1955). It, and the nearby settlement of Profitis Elias, took on the Turkish name of 'Kanli Kastelli' (Bloody Fortress) after a battle in 1647. The limestone peaks of Rokka and Korifi, together with the larger ridge of Kormos to the N, dominate an extensive area of rolling slopes and valleys, with seasonal water-courses in the valleys to E and W (**Plates 45, 46**). The control of this area, a meeting-point for several important natural routes across central Crete, is shown by settlement history to have been extremely strategic (see Evans 1928: 71-5).

The evidence for EIA occupation on both hills has been most recently observed and discussed by Nowicki, based on brief visits (Nowicki 2000: 182-3). Rokka's occupation seems to extend from LM IIIC into Hellenistic. Nowicki only suggested 'probable' EIA occupation on the summit of Korifi, but this can now be confirmed by the present fieldwork, with several clear diagnostic LM IIIC-PG pieces and a large amount of later (G-A/C) pottery found (**Plates 47-49**). The exact span of occupation and size in the EIA are not clearly defined for either site. Both clearly belong to a type of site characteristic of central Crete - large, long-lasting *acropoleis* with defensible characteristics somewhat different from those of many other LM IIIC sites, and with access to a larger potential political and economic territory.

The proportion of gently to steep-sloping land in the area is much higher than in any of the other case studies. The whole region is dominated by Neogene rocks, ranging from conglomerates and flysches to very soft white marls. Rokka and Korifi are part of a basement of hard Jurassic limestone, around and over which the Neogene sediments were deposited. Thin terra rossas with frequent inclusions of hard limestone (X2) cover the slopes of these hills (**Figure 2.2-28**). On the upper slopes of the open basins and valleys which open out around them, hard limestone weathering products overlie or are mixed with those of the soft limestones (X3 and X7 soils). Sherds on the summits of Rokka/Epano Kastello and Korifi, and clearly defined building remains of EIA date on Korifi (**Plate 50**), show limited erosion of the limestone caps since that period. Bronze Age sites (MM-LM III) situated on the mixed soils below have probably been partly depleted or covered by ongoing erosion and deposition, but are still clearly represented by sherds on the surface. Preserved building remains of these periods were found at Vitsiles (see below) at no great depth (c. 0.5m). The *kampos* or plain bounded by Rokka, Korifi and the Kormos ridge is characterised by very thick deposits of well-mixed and sorted colluvium from the surrounding slopes. Very long-term weathering of the deposited material is indicated by its deep red colour; the ongoing process of soil movement may have covered some prehistoric sites in the locality. On the outer flanks of the hills

surrounding the *kampos*, very soft marl-based soils (X4/X8) dominate nearly all the area below c. 300 m asl. The bedrock is rarely exposed here. Soil build-up on these slopes is likely to have been a fairly continuous process since the Bronze Age.

Good-sized springs are found immediately W of the modern village and at 'Fontana',<sup>36</sup> W of and below Rokka. The river beds in the valleys E and W of the raised area formed by Rokka, Korifi and the Kormos ridge are dry in summer under the present intensive irrigation regime, but may have contained water year-round at periods in the past.

### *Settlement history*

Marinatos' excavations at the Vitsiles location, on the saddle immediately S of Korifi, revealed what was called by him a 'palace' - a large and complex MMIB- LM II building - and an associated temple/cult place of MM date. These formed part of a larger settlement site at the same location (Marinatos 1955; see **Plate 51**). Occupation at the site is suggested by Pendlebury to have been as early as EM II (Pendlebury 1939: 60). My fieldwork picked up the location of an extensive MM/LM I site (033) NE of Korifi, at a similar height to the settlement excavated by Marinatos, and another large scatter of about the same date (016) on E-facing slopes further to the S (perhaps an extension of the Vitsiles settlement). The former sherd scatter covers at least 30 000, the latter c. 20 000 sq m. At Vitsiles, Sapouna-Sakellarakis records that LM III pottery extended over the same areas as the MM-LM II material, suggesting a settlement size of approximately 18 000 sq m (Sapouna-Sakellarakis 1990: 87-88). She also outlines evidence for small, dispersed LM III settlement and scattered burials in the region, particularly in the broad valley E of Rokka and Korifi, between these hills and the Jouktas massif. Thus, through the MM and LM periods the area saw a focus of occupation in and around the valley bottoms and lower slopes. The present fieldwork noted a small scatter of sherds of possible LM or later date on a small rocky hill SW of Rokka (044). The caves on the SE slope of Korifi were reported by Marinatos to contain material of MM, LM and PG date (Marinatos 1955).

A very clear example of settlement change occurs in the area in LM IIIC. The Vitsiles settlement does not go beyond LM IIIB, but immediately above it to the N (about 15-20 minutes' climb) is the settlement on Korifi. It is protected by steep cliffs on all sides: even the easiest approach from the W involves much scrambling over rocks. At neighbouring Rokka, access to the summit, where early material is concentrated, is also difficult and the site is easily defensible on all sides, except to the E via the saddle, where there may well have been a

<sup>36</sup> A spring here is referred to by Venetian sources.

defensive wall in the EIA (as in later periods). The adherence to a location close to the MM and LM sites for EIA settlement shows that the area continued to be perceived as of high economic and political value, a point I shall discuss in more detail below.

A 'Geometric' tomb and assumed associated cemetery was noted by Xanthoudides in the locality of Riza, E of Rokka, and Desborough refers to an imported PG Athenian skyphos from a 10th-century tomb at Rhiza (presumably the same one) in the Iraklion Museum (Desborough 1972: 234). On the basis of the surface material, Korifi is probably occupied until at least Archaic. On Rokka the remains are mixed, with the construction of the Byzantine fortress and settlement and its consequent use in the Venetian period obscuring much of the earlier remains (**Plate 52**). However, occupation throughout the period LM IIIC-Hellenistic can certainly be identified from surface material here too (although gaps cannot be ruled out). For the Roman period, Sanders suggests the main settlement lies under the present village, to the NW of Rokka (Sanders 1982: 154). He notes a possible Roman cistern on the saddle S of Rokka, where there are certainly Roman sherds.

The importance of the fortress, which served as a main retreat from and stronghold for Iraklion, meant the settlement on the site of modern Profitis Elias flourished throughout the Byzantine and Venetian periods (Gerola 1905: 181-90). There were also outlying hamlets/*metochia* in this area from at least Byzantine times. Some are known to have been connected (from the 17th century) with the monastery of Ayios Yiorgos Epanosifis on the Monodendri ridge, 7.5 km to the SE of Profitis Elias. Astratigos, a *metochi* in the low hills S of Rokka, probably had its origins as a small monastic settlement in the Byzantine period (Xanthoudides 1948; Petrakis 1956: 55-56; Psilakis 1988: 20-5). Ayia Anna, a small year-round hamlet on the NE slopes of Korifi, is now completely in ruins. It consisted of at least 8-10 dwellings and a chapel. It was last inhabited no more than 40-50 years ago, but its existence dates back to at least the 19th century (**Plate 53**).

The population of the settlement at Profitis Elias has grown significantly in the last century or so, from around 500 in the late 19th/early 20th century to about 1300 in recent decades (Spanakis 1991: 355). Its flourishing status today relates at least in part to its proximity to the island's major port at Iraklion (20 minutes by car/truck) and to the success of the intensive olive and vine agriculture in its vicinity. Large areas of arable land and good communication opportunities were probably instrumental in attracting and maintaining settlement here in ancient times as well.

### *Current land cover (Figure 2.2-29)*

A large proportion of the landscape around the two sites is covered by vine and relatively young irrigated olive planting (under c. 50 years). The use of the loose, dry marl soils for vines has been established since the Venetian period. There are pockets of olives 100+ years old over the whole region, particularly on the gentle slopes with marl soils, indicating that the younger trees may often have replaced much older ones removed when past their prime. Subsistence grain cropping, non-existent today, is likely to have covered large parts of the area in the traditional past, as elsewhere. Some cereal land may have changed its function as little as 20-30 years ago, as shown by the number of presently abandoned or no longer visible *alonia* marked on the 1970s 1:5000 maps.

Land currently used for herding is restricted to the few steep and rocky slopes not worth cultivating in intensive crops. This includes the Rokka massif and lower ridge summits to its E, and the summit and slopes of Korifi - uncultivated islands in a sea of green. Rokka and its S slopes currently have a herd of about 100-200 animals, and the entire hill of Korifi 250 animals. The shepherds owning these flocks also use other grazing grounds in the wider area, including the rocky summit of Jouktas.

### *Cultural features (Figure 2.2-30)*

The number of visible cultural features relating to past land-use was significantly smaller than in the other case study areas. This largely arises from the fact that the landscape, for the most part gently sloping and easily-worked, has required fewer adaptations for agricultural use. In addition, the very intensive nature of present cultivation over most of the survey region means that adaptive features dating from earlier periods are less likely to be preserved/visible.

Traditional agriculture sometimes involved the use of dispersed fieldhouses. As I have mentioned, institutions like the Monastery of Epanosifis made use of *metochia* scattered in the valleys until the 19th century. These - such as Kapella, Astratigos, Merthiotis, and Agalante, are now mostly not in use/minimally-used, illustrating the decline in seasonal residence which has accompanied the growth of monocultures and mechanisation (Petrakis 1956: 52-59). The traditional nucleated settlement at Profitis Elias was unrestricted by topography from quick access to a large prime arable area in all directions, and this may be a reason for a lower number of agricultural outposts here than in the regions of Vrachasi and Chamaizi, for example. Some older structures form the foundations for modern fieldhouses connected with vine cultivation or equipment storage. These were usually not recorded here unless abandoned (e.g. 051), but are particularly frequent over the slopes down to the Platyperama, river W of Rokka. Examples of outlying 19th-20th-century dwelling structures related to agricultural land-

use are the buildings on the saddle of Rokka (002, 036, 038) and on the N and W slopes of the Kormos ridge (051, 041), and the permanent settlement at Ayia Anna (023). A small field shelter exists at 048 on the lower slopes E of Rokka.

The lack of herding-related features confirms that this activity was never very important in the area. There never seems to have been a need for residential *mandres/mitata*. A small animal enclosure (024) is found near the abandoned settlement at Ayia Anna. The large-scale specialised herding on Korifi and Rokka uses modern feeding and milking pens. The shepherds on Korifi now live in Iraklion and commute to work every day; the one using Rokka lives in Profitis Elias.

Terraces are extremely rare. The steep slopes of Korifi and Rokka may have been cleared and cultivated in the past, since they now support garigue, but the lack of much terracing suggests this was not extensive, presumably thanks to the wealth of deeper, more easily-worked soils in the area. There are terraces in the saddle S of Rokka. On the slopes of the Kormos ridge, with more attractive (marl) soils but fairly steep gradients, terraces appear (e.g. 020). They are usually broad, up to 15m wide, suggesting a past use for grain cultivation, although olives now grow there. A few similar broad terraces are found on the higher slopes S of Rokka. Sometimes the whole top of a hill or ridge is retained by a very long terrace, whose main function seems to be to prevent erosion. These are still maintained.

There are a few examples of boundary features. A linear arrangement of olives up to 200 years old on the higher N slopes of the Kormos ridge probably marks an old property boundary (**Plate 54**). A ridge-top enclosure on the Kormos ridge, surrounded by olive plantations, contains a low maquis (019). This may represent a vine plantation from a time when the main crop in the area was grain. Several walls on a low hill E of Korifi probably represent old field boundaries (013, 014, 015). They now all lie within a single large plantation of olives. Clearance piles of mixed rubble appear on the slopes S and W of Rokka among the vines and olives which cover these areas (e.g. 034, 049). They are sometimes very sizeable, showing the impact of clearance on improving the cultivation potential of these upper rocky slopes. Their linear arrangement in some cases suggests their use as property boundary indicators (cf. Rackham and Moody 1997: 140; 152). They are almost impossible to date, but are still being added to as new areas are ploughed for cultivation.

A set of three watermills was located during the course of the survey, E of Korifi (025-028, 032, **Plate 55**). Their condition suggests that they have been out of use for at least 40-50 years. The water flow which worked them is now seasonal. A windmill (029) is located on a outcrop of hard limestone above them to the W.



In the last 10 years large open cisterns (plastic-lined, of oval shape and up to 30m in length) have been constructed at several locations on the slopes N and E of Kormos and Korifi and S and W of Rokka. Cisterns are also found in several of the stream beds, retaining some of the winter/spring flow for the summer months. This has been necessary to provide for the irrigation of the dense vine and olive plantations. Under an historically more diverse regime, less water would have been required. Even with the sources now available, locals still complain that there is not enough water for adequate irrigation, and several *geotreseis* (geological wells) have been constructed.

#### *Documentary evidence for past land-use*

Basilicata's line drawing, dated 1615 (Gerola 1905: Fig. 91), shows the whole *kampos* apparently under cultivation. Though distinction cannot be made from the drawing between vine, cereal or other crops, it seems that olives (now present, some of age 100+ years old) are not shown on the *kampos* at all. The records of the Monastery of Ayios Yiorgos Epanosifis include a sale to the monastery in 1694 of a holding very close to modern Profitis Elias, probably in the *kampos* or nearby (Stavriniadis 1984-87 (G): 78). On this 1-2 ha holding the document mentions vineyards, cereal land and a very small area of 'wild' land, presumably used for grazing, along with 20 sheep (presumably grazed here and elsewhere). The considerable extent of cereal land is the main contrast between today's land-use in the area (with no cereals at all) and that of the late Venetian period. Other 17th- and 18th-century documents referring to the area regularly mention vineyards, as well as wild/grazing areas (e.g. Stavriniadis 1984-87 (D): 214; (E): 93-4). Pashley notes that the ten *metochia* owned by the monastery in his time produced 'mostly corn', as well as wine and oil (Pashley 1837 (I): 228). The mention in 1707 of the working watermill at 'Kara Mirachor', in the vicinity of Profitis Elias/Kanli Kastelli village,<sup>37</sup> supports the other indications of a role for cereal crops in the area (Stavriniadis 1984-87 (D): 358).

The use of almost every available piece of land for cash cropping is fairly recent, as demonstrated by the photographs of the *kampos* published by Marinatos, which show garigue and maquis cover in parts of it (Marinatos 1955). Marinatos records the area of Vitsiles as consisting of wild, as well as cultivated land, and despite the poor quality of the late 19th/early 20th-century photographs published by Gerola and Taramelli, these also seem to show areas of uncultivated land (probably grazed) on the *kampos*, where hardly any exist today (e.g. Gerola 1905: Fig 92). Taramelli records the planting of vines on the Vitsiles saddle as causing ground

<sup>37</sup> Perhaps the one recorded by the fieldwork, which I have referred to above?



disturbance which revealed the archaeological remains: this suggests that the area was either previously uncultivated or supported shallow-rooting crops such as cereals (Taramelli 1899: 347). Gerola's photograph of the saddle of Rokka, now garigue-covered, appears to show patches of grain cultivation on this flattish area, whose soils, though thin and rocky, would be adequate for cereals (Gerola 1905: Fig. 96).

### *Soils (Figure 2.2-28)*

Mixed soils from the *in situ* weathering products of soft limestone overlain by those of hard limestone (X3, X7) had the highest CECs, due to high available calcium. Although somewhat stony, these are today widely cultivated, except on very steep slopes. High CECs were also found for the terra rossas on hard limestone (X2). However, these soils had not been favoured for cultivation, probably because of their physical characteristics. The loose, deep *kampos* and marl soils seem to have been most intensively favoured. The marl soils have moderate CECs. By analogy with soils of the same type near Chamaizi (see above) they may be relatively poor in holding water.<sup>38</sup>

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<sup>38</sup> Vines favour such dry, light soils.

**Table 2.2-21** Soil codes and descriptions for the Profitis Elias area (Figure 2.2-28)

Code	Munsell colour	Description
X1	10 YR 5/3	Sandy silt. <i>In situ</i> terra rossa derived from hard limestone, with archaeological material. Frequent angular inclusions of hard limestone up to c. 0.2m in diameter.
X2 X2 (1)	10YR 5/2	Sandy silt. <i>In situ</i> and transported terra rossa derived from hard limestone. Frequent angular inclusions of hard limestone up to 0.2m in diameter.
X3	2.5Y 7/2	Sandy silt. <i>In situ</i> weathering products of soft limestone overlain by those of transported hard limestone products. Loose, with frequent angular inclusions of the latter up to c. 0.15m diameter and occasional inclusions of frags of soft limestone up to 0.1m diameter.
X3(1)	7.5YR 5/3	Clayey silt, sometimes compacted. Transported, mixed colluvium derived from weathering products of hard limestone and soft limestone/sandstone. Occasional inclusions of hard limestone up to c. 0.1m diameter. Deep (regularly 2m+).
X4	2.5Y 6/3	Sandy silt. <i>In situ</i> and transported weathering products of marl and soft limestone/sandstone. Few inclusions of frags of soft limestone/sandstone and of hard limestone (from localised outcrops) up to c. 0.05m diameter.
X7 almost exactly similar to X3		Sandy silt. <i>In situ</i> weathering products of soft limestone, overlain by transported hard limestone products. Includes archaeological material. Occasional inclusions of soft limestone/sandstone and hard limestone frags up to c. 0.1 diameter.
X7(1)		As X7, with inclusions of archaeological material.
X8 X8 (1)	2.5Y 5/2	Sandy silt. <i>In situ</i> and transported weathering products of marl. Deep and loose. Few inclusions of soft limestone/marl up to c. 0.5m diameter.
X9	2.5Y 7/2	Sandy silt. Transported weathering products of soft limestone/sandstone (terra rossa type). Few to occasional inclusions of frags of soft limestone up to 0.1m diameter
X10 related to X6	2.5Y 5/2	Coarse sand/gravel. <i>In situ</i> weathering products of limestone flysch, not forming a soil.

**Table 2.2-22***Chemical characterisations of soils in the Profitis Elias area*

Soil code	Percentage of 1-hour range	pH	Carbonate (%)	K (m.e.)	Na (m.e.)	Mg (m.e.)	Ca (m.e.)	CEC (m.e.)
Rock	1.5	not tested						
X1	1.2	not tested						
X2	6.6	7.98	76	0.98	1.27	8.40	641.47	652.12
X2		7.79	63	0.42	0.25	6.98	363.77	371.42
X3	1.2	8.06	4	0.6	2.66	4.93	641.47	649.66
X3 (1) (kamos)	2.8	8.23	11		0.61			
X4 (top of Kormos ridge)	0.7	7.87	65	0.34	0.57	4.07	453.09	458.07
X4	21.8	7.82	52.5	not tested	0.4	5.37	360.79	366.56
X7	0.8	7.48	14.5	1.09	0.32	4.33	204.84	210.58
X7(1)	0.9	not tested						
X8	62.5	7.90	17	0.47	0.27	1.13	391.09	392.96
X8 (B horizon)		8.84	6	0.11	2.66	3.24	322.60	328.61
X10	0.1	not tested						

**Table 2.2-23 (Figure 2.2-31)***Land potential calculations for the 1-hour range of Profitis Elias Rokka and Korifi*

Total territory area	1579 ha
Total area of 1st-class arable	1495 ha
Total area of 2nd-class arable	13.5 ha
Total area of probable 2nd-class arable	26 ha
Combined probable and certain 2nd-class arable	39.5 ha
Very poor/uncultivable	29.5 ha
Rock	14.5 ha

**Table 2.2-24**

*Carrying capacity calculations, 1-hour range of Profitis Elias Rokka/Korifi*

<i>Description</i>	<i>Quantity</i>
Total area/animals grazed	1579
Prime + 2nd-class arable + (prob. 2nd-class arable x 0.5)	1521.8
Prime + 2nd-class arable	1508.8
Prime + (2nd-class arable x 0.5)	1501.9
Prime + (2nd-class and prob. 2nd -class arable x 0.5)	1508.4
No. of individuals on 100% cereals, annual fallow	1268 or 1257 or 1252 or 1257
No. of individuals on 100% animals	30 or 30 or 30 or 25 (32)
Total no. of individuals able to be supported	1298 (1300) or 1287 (1289) or 1282 (1284) or 1282 (1289)
40% of total	519 (520) or 515 (516) or 513 (514) or 513 (516)
Estimated size of the LM IIIC-PG settlements (minimum)	Impossible to estimate without more detailed studies. On the basis of comparison with other sites of this period and available space for occupation, at least 15 000 sq m each, probably more
Estimated population for both sites (minimum)	c. 625 - 750

### *Conclusions*

The 1-hour range of the sites is very large, thanks to the gentle gradients of the landscape. It also has an exceptionally high carrying capacity, with a large proportion of prime arable land. Sizeable and long-established BA settlement in the area suggests that the infrastructure necessary to fairly intensive agricultural exploitation was already in place, with little or no 'colonisation' needed, by the EIA. However, the size of the EIA sites suggests a concentration of population which quickly exceeded that of the BA. It must have required a expanding subsistence territory. The spread of prime arable land in all directions would facilitate this, provided that it was not encroached on by neighbouring settlements. This may well have been the case before the A-C period, as Knossos, Astritsi Kefala and Krousonas Koupo all developed.

While the sites are not of the most defensible type, they compare in defensibility to those of Frati Kefala and Vrachasi Anavlochos. As in other regions, the importance of defensibility in the EIA is shown by a general contrast with both the BA and historical/traditional settlement pattern - pointed up by the historical use of Rokka for specific defensive purposes. In the case of these and of most other EIA settlements in central Crete, a very successful compromise in location priorities seems to have developed between

defensibility, large size, access to prime arable land and strategic position on communication routes.

Before moving to an analysis of the results of the fieldwork in the next chapter, it seems worthwhile to produce a summary table of carrying capacity calculations for all the sites to allow cross -reference and comparison.

**Table 2.2-25 Summary table of carrying capacities, all case study areas**

Site	<i>Frati Kefala and Kefali</i>	<i>Vrachasi Anavlochos</i>	<i>Kritsa Kastello</i>	<i>Tapes Epano and Kato Kastello</i>	<i>Chamaizi Liopetra</i>	<i>Profitis Elias Rokka/ Korifi</i>
Total 1-hour range	1100 ha	1300 ha	1263 ha	1518 ha	848 ha	1579 ha
Total available arable	620 to 789.5 ha	663.5 to 874 ha	580 to 942.8 ha	473.2 to 962.4 ha	445.4 to 588.1 ha	1508.4 to 1521.8 ha
No. of individuals able to be supported on 100% cereals, annual fallow	517 to 658	553 to 728	484 to 786	394 to 802	371-490	1252 to 1268
No. of individuals supported on 100% animals (minimum) – assuming only cleared land grazed (or all land grazed, in brackets)	12 to 16 (22)	13 to 17 (26)	12 to 19 (25)	9 to 19 (30)	9 to 12 (17)	25 to 30 (32)
Total no. of individuals able to be supported - assuming only cleared land grazed (or all land grazed, in brackets)	531 (539) to 674 (680)	566 (579) to 745 (754)	496 (509) to 805 (811)	403 (424) to 821 (832)	380 (388) to 502 (507)	1282 (1284) to 1298 (1300)
40% of total	212 (216) to 270 (272)	226 (232) to 298 (302)	198 (204) to 322 (324)	161 (170) to 328 (333)	175 (178) to 201 (203)	513 (514) to 519 (520)
Estimated site size (square metres)	c. 15 000 (Kefala) and c. 10 - 15 000 (Kefali)	c. 15 000?	c. 30 000	c. 22 000 (Kato Kastello) and c. 1000 (Epano Kastello)	15 - 20 000	Not possible to estimate - minimum 15 000
Estimated population for the site or sites (minimum).	c. 521 - 750	c. 313 - 375	c. 625 - 750	c. 479 - 575	c. 313 - 500	c. 625 - 750

## Chapter 2.3

### Conclusions on the relationship of settlement and subsistence economy, LM IIIC-PG

In this chapter I discuss the conclusions from the fieldwork most relevant to understanding of the relationship between settlement and subsistence land use in the Cretan EIA. Some general observations from the field studies about historical and present-day relationships between land use, subsistence and settlement are also made here.

#### *Recent changes in land use and settlement*

The work illuminated the rapid change through which the Cretan countryside has passed in the last 50 years. The main land-use changes in the areas studied had been the decline in cultivation of grain/legumes and of specialised tree crops like almond and carob, although both the latter are still maintained and harvested at various scales in some areas (e.g. Kritsa). This decline has usually taken place in favour of expanded (irrigated) olive cultivation, a development of the last 30-50 years. Small-scale vine cropping has often also undergone a decline, again corresponding to the expansion of olive and of hothouse crops. Exceptions to this are regions with long-established intensive vine cultivation, exemplified by the Profitis Elias area.

Exclusive favouring of low-lying areas, with little angle of slope, for cultivation has increased, though land-use history indicates that these have nearly always been the most attractive for agriculture. Abandoned terracing, often associated with past cereal cultivation, on the steeper, higher slopes (usually dominated by thin soils), indicates the fairly recent desertion of this type of land. Intensive cash cropping has not required it, and other crops have not been worth the difficulty in access for machines. Much is now turned over to grazing, but bulldozed terraces and olive planting are beginning to spread onto it in some cases.

It was apparent, as other studies have noted, that an important element of traditional land-use - the fieldhouse distant from the main village - has largely declined. These abandoned structures were often located on land with a steep gradient and rocky or thin soils, but had been in many cases the focus of a broad-based seasonal smallholding, including sheep/goat herds, grain/legume and garden cultivation. The system these features represented in the areas studied was not transhumance, since the zones of permanent (village) residence and seasonal activity did not show intrinsic ecological contrasts. Fieldhouses presently used for agriculture are often very close to the villages, but there are examples of more distant *metochia* still in use, mostly for olive or vine cultivation. A nucleated village pattern is seen at Vrachasi, Kritsa and Profitis Elias, but there is an absence in the last two areas of the use of distant fieldhouses, modelled by Halstead as traditionally accompanying the nucleated pattern (Halstead 1987). This fact seems



linked to the rather intensive character of traditional agriculture around these settlements, which could access a large area of prime arable land in their immediate vicinity. In the Kritsa case, the adjacent *kampos* has historically been the focus of cultivation, although there was use of fieldhouses on the second class arable/grazing to the W of the village. At Profitis Elias, the long establishment of intensive vine agriculture, as well as the proximity of the prime arable to the main settlement, meant there was little need for fieldhouses. At Vrachasi, extensive land-use facilitated by fieldhouses was more common, probably relating to the more broken topography of the prime arable areas, and corresponding best to Halstead's model. In the Frati area, where the villages were small and fairly densely-scattered in a rather dissected (but arable-rich) landscape, fieldhouses had played less of a role. But at Tapes (where permanent villages are also small) there were very frequent fieldhouse/*mitato* extensions onto the relatively sparse pockets of arable land, a practice traditionally essential to cultivation in this area. In common to all these examples is the co-location of permanent settlement with the largest area of prime arable land, tending to support Bintliff's notion of access to arable as a significant consideration at many periods in Aegean history and prehistory (Bintliff 1977a: 98). The Liopetra area, alone of all the studied regions, has no large permanent nucleation in what is quite a sizeable arable zone. However, it is distinguished by its high number of intensively-used *metochia* (some still in use), constituting a major part of the historical settlement pattern in their own right. Their concentration here represents a crossover between extensive and intensive forms of land use in relation to permanent settlement. Although the *metochia* belonged to the villages at Chamaizi and Skopi, they are so dense as almost to have formed their own 'settlement' area.

Where main settlements had relocated in the last 50 years, this was often related to the increasingly centralised distribution of basic goods/services from the main cities/ports, accessed by asphalt roads. In the Frati area, the Ayia Pelagia and Mixorrouma village relocations were of this type.

#### *Changes in 'natural'/climax vegetation cover*

The fieldwork, while not of a specialised ecological nature, provided evidence which may be taken into account with regard to vegetation history in Crete. Published studies show that annuals, particularly grasses, can out-compete tree/tall shrub cover on flat areas of deep soil (though not on steeper, rocky slopes) after grazing ceases (Kotsidou and Margaris 1992; Blumler 1993). Their conclusions are strongly supported by observations made here. There were numerous examples of areas once under cultivation which, even in the absence of grazing, have not succeeded to tree cover. Instead, a 'meadow' community of tall grasses and

cultivation weeds had colonised them. Still, the colonisation ability of trees appears very strong even on flat excultivated land (Watrous et al 1993: 204-14). For example, at Kritsa, flat, deep-soiled ex-grain terraces on the slopes E of Plativolo have been colonised by oak woods within the last 50 years.

These observations are in general agreement with those of Rackham, and show the inadequacy of classifying landscapes like Crete's as 'ruined' or assuming a once-uniform climax cover (Rackham 1990, 1992, 1996; Rackham and Moody 1996:123-39). Although erosion through grazing may be a significant danger to future productivity on many of the lower hillsides, the long-term resilience of such areas, despite thousands of years of clearly variable land-use, is apparent. The current expansion of olive planting on bulldozed terraces into zones of stony and eroding soils on steep slopes shows that such areas can still prove productive (especially when boosted by irrigation).

#### *Geomorphology, soil characterisation and soil use*

It was generally observable that sites dating between the MM and T periods were relatively little disturbed by erosion where they lay on slopes or low prominences. This was true of, for example, MM sites at Chamaizi, MM-LM sites at Profitis Elias, V-T sites on the slopes around Kritsa, and the small EIA sites around Anavlochos. Displacement of material has undoubtedly taken place, but concentrations of sherds associated with building remains remain visible at the original site locations. Some sites of the same chronological range located on valley floors, e.g. in the Frati and Kritsa areas, may now underlie the thick deposits which have built up there over time. While account had to be taken of these changes, my observations seemed to indicate that major geomorphological movements, significantly changing the productive character of large tracts of the study areas, have not occurred since the EIA.

In the hard limestone relief areas, terra rossa-type soils are likely to have characterised substantial areas of the EIA landscape to broadly the same extent as they do today (the sherd scatters of the EIA sites themselves lie on them). Past and present environmental conditions and land use have caused them to become eroded to varying degrees, with a mosaic transportation of them down onto the valley floors (e.g. at Frati, Kritsa, Profitis Elias). Where other bedrock types are important, e. g. the soft flysches of the Frati area, soil types derived from these are likely to have been roughly as extensive in the EIA, as they are today. The other main type of soil in most areas, the *in situ* weathering products of phyllites, is often found in valley sides and floors, or on hill saddles and shoulders where phyllite bedrock is exposed (e.g. at Anavlochos and Tapes). These soils too have varied relatively little in their extent over time, but where they derive from small exposures, their proportional extent in relation to the hard limestone-derived

soils depends on degree of exposure/outcropping in an area, being increased over time by erosion of the limestone. Thus, some areas of these soils may have been smaller during the EIA. As I have already noted, the Neogene sediments have been eroding at a relatively rapid rate through the Holocene period. The steady ongoing process of *in situ* weathering, erosion, transport and deposition of the very soft marls of the Profitis Elias region makes it difficult to reconstruct the past topography of these rolling slopes at any one period, but they have been dominated by marl-derived soils throughout the human occupation of Crete. The marls and conglomerates of the Chamaizi area are also very erodible and are likely to have covered larger extents of the landscape in the past. The location of a Final Neolithic site on a marl cap suggests other sites of this date in the lower-lying zone around it might have vanished along with marl remnants. It is difficult to estimate the extent of these, and the soils derived from them, in the EIA.

In order to cross-check observations made from the fieldwork about soil characteristics and use, the opportunity was taken to make detailed comparisons with the soils classified by other published studies of Crete. These comparisons, and the major characteristics of the soil types defined in this way are set out in Table 2.3-1 below.

Table 2.3-1 Soil groupings from the studies and parallels from other studies in Crete

Soil group	Parallels (Bintliff 1977a: 609-14; Bintliff 1977b, Morris 1994; Morris et al forthcoming; Nevros and Zvorykin 1939)	Description	Use-related characteristics and variants (NB: 'Deep' is a relative term, used here to signify 1m+. As already noted, average soil depth on gradients is 0.3m or less)
GROUP 1 E1 G2 D1/2 S10/S11 X1/X2 C20 X6/x10	Bintliff D group Vronda 4 Terra Rossa (Morris et al) Nevros and Zvorykin sample types 33, 36, 34	Hard limestone- derived terra rossas ( <i>in situ</i> )	Silty/clayey. Usually stony with frequent inclusions of hard limestone, and shallow. High CEC, high carbonate <sup>1</sup>
GROUP 2 D6 G7 E12/E2 S13	Bintliff B group Kavousi CT unit Nevros and Zvorykin sample types 23	Phyllite-derived <i>in situ</i> terra rossas/'Brown forest soils' (Bintliff)	Sandy. Often in relatively deep deposits, but sometimes stony, with phyllite inclusions. Relatively low CEC compared to limestone terra rossas.
GROUP 2a C7, C8	Nevros and Zvorykin 39, 23, 48 'Karphi 4'	Phyllite-derived <i>in situ</i> /transported terra rossas.	Sandy silt. Deep, loose, with occasional to frequent medium/large phyllite inclusions. Moderate CEC.
GROUP 3 E2 G2/G3 C6 C16 S12 S1	Bintliff E group Vronda 9 related	Transported hard limestone weathering products over <i>in situ</i> phyllite weathering products.	Sandy silt. Usually on slopes. With occasional-frequent inclusions of hard limestone fragments. S1 is from phyllite beds within hard limestone (different localised concentration). S12 includes transported phyllite-derived material. Moderate to high CEC.

<sup>1</sup> Given variable chemical characteristics within the same soil type, shown by the analyses in Chapter 2.2, these are very broad generalisations.

GROUP 4 G2/G3 D3 G3 E3 S15 X3 X7/X3 X7(1)	Related to Bintliff F group (purely from soft limestones Vronda 8	Transported hard limestone weathering products over <i>in situ</i> weathering products of soft limestone.	Sandy silt. Loose and often deep, with occasional surface inclusions of hard limestone fragments. S15 is from <i>in situ</i> soft limestone without hard limestone overlay. Moderate to high CEC, high carbonate.
GROUP 4A S15 D4		Derived from <i>in situ</i> or transported weathering products of soft limestone.	Sandy. Deep, loose, homogeneous. Few inclusions of fragments of soft limestone. High CEC.
GROUP 5 X4 X8 S16	Bintliff A group	Derived <i>in situ</i> from marl.	Sandy silt. Often deep, loose. High CEC.
GROUP 6 C9 E2	Kavousi 1 (on steep slopes) Vronda 9	Mixed colluvium from weathering products of hard limestone and phyllite (predominantly phyllite).	Sandy silt, with frequent inclusions of hard limestone fragments. Often of substantial depth (2m+). Low to moderate CEC.
GROUP 7 E10 C10	Bintliff C group Kavousi 2 Nevros and Zvorykin 1939: 276 Alluvial deposits	Mixed colluvium from weathering products of hard and soft limestone and phyllite.	Sandy silt, clayey in some areas. Sometimes compacted. Usually of substantial depth, i.e. 2m or more, although variable. Moderate CEC. Good water retention. <sup>2</sup>
GROUP 8 D7 X3 (1)	Vronda 8	Mixed colluvium from soft limestone and quartz/hard limestone weathering products.	Sandy silt. Frequent small-medium-sized inclusions of quartz/hard limestone. Moderate to high CEC.
GROUP 9 E4/E8 S17 C18		<i>In situ</i> weathering products of conglomerate.	Sandy silt. Very frequent rounded small-medium pebbles in a silty matrix. High CEC. Good water retention.
GROUP 10 S2		Colluvium derived from pebble beach/stream-bed deposits.	Sandy silt. Very similar to Group 9, but loose, with little matrix in proportion to very frequent small- to medium-sized rounded pebble inclusions.

<sup>2</sup> This characteristic was not tested for in the present study and is always suggested by analogy with the results of testing of similar soil types by Morris 1994 and Morris et al forthcoming.

GROUP 11 S18	Parallels with Group 3 soils	<i>In situ</i> weathering products of phyllite overlain by transported weathering products of conglomerate.	Sandy silt. Deep, loose with frequent small-to medium-sized rounded pebble inclusions. High CEC.
GROUP 12 S19		<i>In situ</i> conglomerate weathering products overlain by transported weathering products of marl.	Sandy silt. Often deep, with occasional small-medium-sized pebble inclusions. Low to moderate CEC.
GROUP 13 C18?		<i>In situ</i> weathering products of serpentinite and other igneous rocks overlain by weathering products of hard limestone.	Silty sand. Occasional to frequent inclusions of hard limestone and igneous rocks. Not chemically tested.
GROUP 14		Pleistocene palaeosols?	Clayey silt, often compacted and containing frequent small fragments of hard limestone.

From the outset of the study, it was recognised that the physical and chemical characteristics of soils must be looked at in conjunction with their actual long-term use in order to understand the land's real potential. Of the two examples of hard-limestone-derived soils studied by Morris et al (forthcoming), it is apparent that one (the 'Terra Rossa') has a relatively high water-holding capacity. Both (like the examples analysed in my studies) have relatively high CECs. However, both the present studies and those of Morris showed that the thinness and rockiness of such soils (e.g. G2, E1 or D1) on steep slopes has made them consistently disfavoured for agriculture.

In my studies, soils formed from *in situ* weathering products of soft limestones overlain by transported products of hard limestones were found to be physically easy to work and also to have high chemical fertility (E3, D3, D7, and G6; see also Morris et al's Vronda 8, which has a high water-holding capability as well). Phyllite-derived soils of *in situ* (E12, D6, G3) and transported type (G2/G3, G7, C5, C21, and E2), sometimes mixed with hard limestone weathering products, were well-represented in the studies. At Kavousi, both phyllite types had relatively low water-holding capability and only moderate CECs. However, these soils (with their usual distribution in valley floors) were favoured in use for agriculture, and the same fact was reflected in the present study. This also applied to the deep mixed colluvial types C9 and C7.

It appears generally true that if a soil has a good water-holding capacity, it can be highly-favoured for agricultural use despite having a relatively low CEC and other



‘discouraging’ physical characteristics.<sup>3</sup> This was the case in the Morris study for the otherwise sub-optimal Kavousi 1 (which is sloping and rocky) and Kavousi 3 (which is clayey). But water-holding capacity is not always the most important consideration for agricultural use - cf. the use of phyllite soils mentioned above. A feature to note from the Kavousi analyses is the characterisation of Kavousi 2, the *kampos* soil. Haggis’s characterisation of the Kavousi *kampos* as being traditionally difficult to cultivate without irrigation is his basis for arguing that LM IIIC settlement movement was caused by the absence of political structures needed to facilitate this. The argument is weakened by the results of Morris’s study. The soil is shown to have a very high water-holding capability, as well as being flat, workable, deep and with a moderate to high CEC. Its chemical characteristics have not changed very substantially from those of its buried horizon of c. 1000 BC, although a depth increase of c. 0.8m since that time has improved the attractiveness of the soil for agriculture. The soil shares many characteristics with the Kritsa E10 and Frati C10 types. While in the EIA such soils may have been less obviously attractive for cultivation in comparison to other types than they are today (because shallower, etc), it is likely they could be productive without artificial irrigation, thanks to their water-holding capacity as well as their chemical characteristics. The long-term favouring and productivity of these kinds of soils is shown by land use history. The shallow wells sometimes traditionally used to improve cultivation them (as on the Kritsa *kampos*) were of a type which could easily have been dug in antiquity without great investment of labour.

As I suggested in Chapter 2.1, grading of arable land on a comparative basis *between* the study regions proved very difficult, given the many locally-variant factors taken into account. Thus, as planned, the ‘prime arable’ designation was simply applied to the best-quality land within an single study area. However, differences in the relative quality of ‘prime’ arable did become apparent. The extensive areas of deep mixed colluvium on valley floors at Frati and the Kritsa *kampos* and the deep marl soils of the Profitis Elias region (despite the latter’s dry character) were undoubtedly of higher cultivable value, due to their ease of working and low gradients, than the ‘prime arable’ areas of phyllite and marly soils in the Anavlochos, Chamaizi and Tapes regions. It is very interesting to note that the first three areas just mentioned have been favoured for intensive cultivation historically, traditionally and still today, and that LM IIIA-B settlement preceded the EIA sites in the same areas (although in different locations). In the latter three areas this is not the case. I will return to this point below.

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<sup>3</sup> Blitzer noted that the importance of water-holding capability has long been recognised by farmers in the Mesara (Blitzer 1993b: 241).

If the type of soil most historically favoured for agriculture was colluvium on plains or wide valley floors, second-favoured (because of their relative depth and ease of working) were soils on gentle slopes, derived from phyllite/flysch/soft limestone *in situ*, and/or mixed with overlying hard limestone weathering products. Despite potentially high chemical fertility, hard limestone-derived terra rossas on steep slopes were always shown to be least favoured in use for agriculture, due to shallow depth, slope angle, rockiness and probably poor water-holding abilities.

The above observations show the dominance of topography and of the physical attributes of soils over their chemical ones in favouring land use, but also highlights the effect of changing economic contexts on whether and how less-valued soils were exploited for agriculture, since as I have shown, cultivation has spread at different periods onto the 'worse' soils. I suggest that the most accessible, easily worked soils were likely to have been favoured even at the period of the LM IIIC settlement shift, wherever this was possible. However, the other soils in the immediate vicinity of the sites, even including the stony terra rossas, were certainly capable of yielding a return on cereals, legumes or tree crops (except where the altitude limit, e.g. at Karfi and Tapes Epano and Kato Kastello, prevented olive cultivation). The proportion of the immediate hinterland which was used is likely to have varied substantially between settlements, partly depending on the amount of better arable in the wider vicinity, but also on political relationships bounding the extent of exploitable territory (see Chapter 3.1 below).

#### *Modelling subsistence economy at the defensible sites: significance of the survey results*

The previous history of settlement and land use would at first considerably affect subsistence possibilities at the new settlements. At sites like Kritsa Kastello, Frati and the Profitis Elias group, LM III settlement in the same area had undoubtedly exploited the main areas of arable around the settlements, and crops like olive and vine, which take years to become productive<sup>4</sup>, are likely to have been already established in the locality. The same scenario is likely at sites like Palaikastro Kastri, Arvi Fortetsa, Praisos/Kalamafki Kipia, Vrokastro, Milatos Kastello and others, which had LM III settlement in their vicinity.<sup>5</sup> Where higher mountain slopes near the sites had been previously cleared, or supported at most only patchy woodland, immediate commencement of more intensive use of these zones would be more easily possible. That many

<sup>4</sup> Hanson 1992: 162; Amouretti 1992: 80.

<sup>5</sup> See Popham and Sackett 1965; Nowicki 1996; Whitley et al 1999 for details of some of these sites.

of them were already partly cleared seems likely, given the postulated extent of LM IIIA-B herding.

At sites without pre-existing settlement in their vicinity, e.g. the Tapes sites, Karfi, Loutraki Kandilioro, Kavousi Kastro, Erganos Kefali and Mirthios Kirimianou,<sup>6</sup> a certain amount of colonisation - clearing, terracing, pathmaking - is likely to have been undertaken in the cultivable areas of the new hinterlands. Domestic stock could be grafted onto wild olives *in situ*<sup>7</sup> to produce new stands near to the new settlements, but even this 'easy' procedure would require initial effort in clearing competing wild vegetation, regular maintenance thereafter and some time before good yields could be obtained. In these cases, at least at first, we might expect direct use by the new settlements of existing stands of olives and vine at some distance away, or collaboration with better-placed settlements to procure these crops (particularly where olive could not be grown, as at Karfi: a model of this kind has been proposed by Nowicki (Nowicki 1995b). Cereals and legumes, quick-growing and storable, seem likely initially to have been the crops of preference around sites in previously uncolonised areas. For all the new settlements, where it was possible to continue any use of large areas of previously exploited good quality arable further away from the settlement - e.g. the Lakkonia plain for Tapes, the Gournia area for Asari Kefala, the Kavousi *kampos* for Kavousi, the Episkopi region for Kato Chorio Profitis Elias<sup>8</sup> - this might be expected to occur. It would be encouraged by the limited carrying capacity (except under very intensive exploitation) of many new sites' immediate hinterlands, and the constraints imposed by the density of settlement distribution. In the case of highly inaccessible refuge places like Monastiraki Katalimata and Elliniki Korifi, we might expect the use of some fieldhouses or single dwellings connected with agriculture closer to the main prime arable areas, and/or collaboration with another settlement close to these areas (perhaps the case for Monastiraki Katalimata and Chalasmeno, and Kavousi Kastro and Vronda). Examples of EIA field- or farm-houses are difficult to retrieve evidence for (see the next chapter).

The immediate hinterlands of many LM IIIC defensible sites include significant amounts of land of less than prime arable status. Although the very long-term use of second-class land for cultivation in Greece is recognised,<sup>9</sup> it is the clear contrast between LM IIIC site

<sup>6</sup> See for these sites Nowicki 1996; Nowicki 2000: 206-9; 143-7.

<sup>7</sup> As described by Amouretti 1992.

<sup>8</sup> See Nowicki 2000: 106-7; Watrous forthcoming a, b, c for references to some of these sites. All the sizeable arable areas referred to have LM IIIA/B settlement on or close to them.

<sup>9</sup> Amouretti refers to 'une domaine non négligeable des piemonts et des collines ou les conditions sont médiocres mais non exclusives pour la culture' (Amouretti 1986: 27).

hinterlands and those of traditional, historical and Bronze Age settlements in the same areas which most clearly demonstrates that movement to the new sites was not primarily stimulated by subsistence considerations. The EIA sites are significantly less accessible from the areas of prime arable land than are traditional settlements in the same locality. They are often slightly removed from springs, while the traditional settlements are usually immediately adjacent to the springs or other water source, e.g. at Frati, Kritsa and Vrachasi. This relative inaccessibility from basic resources is linked to other characteristics of site topography which clearly relate to defensibility. Haggis has tried to make a direct analogy between LM IIIC and traditional/historical settlement at Kavousi, with settlement in both periods being small, dispersed, off the prime arable areas and close to springs. He suggests that this has long been the most efficient way of exploiting the landscape of the area. However, the fundamental contrast between traditional/historical and EIA settlement's relationship to subsistence resources seen in all of the present case studies suggests that too much extrapolation from a single study is unwise. Macroeconomic/political context is rightly seen by Haggis to have played an important role historically in the relationship between settlement and subsistence. However, my fieldwork showed that long-term use for agriculture of the deep, easily worked soils of areas the Kritsa *kampos* and Ayios Vasilios valley has never depended on the support of a complex social and political system. EIA changes in political and wider economic organisation gave no reason to stop using such valuable areas, which could easily be worked from the new settlements.

Direct comparison between land potential in the territories of sites occupied continuously from LM IIIC through the later Iron Age, and those abandoned by the PG period, shows a greater proportion of prime arable in the immediate hinterlands of the continuing sites. At Vrachasi Anavlochos, and particularly Profitis Elias Rokka and Korifi, the size of the 1-hour range is large, thanks to topographical factors - i.e. the immediate hinterland was able to support a larger population. This is not the case at the large and long-lived Chamaizi Liopetra settlement, but the 1-hour range limit produces a partly misleading impression in this case: the nearby presence of large, accessible prime arable areas just bordering the 1-hour range must be taken into account.<sup>10</sup> An extensive, accessible arable hinterland is unlikely to have wholly determined settlement longevity, though: the shift of settlement focus in the 10th century related to other ongoing changes in EIA economy and society, as I shall show in Part 4. For example,

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<sup>10</sup> However, this fact is still significant. Liopetra is an example of a particular, less common type of settlement continuing in PG-A - discussed further in Part 4.

Kritsa Kastello did not survive the PG period, despite its adjacent large prime arable area, favoured by both LM III and historical/traditional settlement.

While cultivation activities have left substantial traces in the landscape, the role of herding over time is less easily gauged from cultural remains. In none of the surveyed areas has herding traditionally been the only means of subsistence for the majority of the population. Observations reflected the general land-use pattern of traditional/historical herding in Crete, described in Chapter 1.5. The positioning of boundary walls indicated that the higher hillsides with the most rocky outcrops were traditionally used for grazing, but that these had often been only a few metres above cultivated areas used for grain, vines and vegetables (e.g. at Frati, Tapes). The main grazing areas today include land perceived according to modern standards as not worth cultivation, but extensively cultivated in the past. Only the mountainous zones - large areas of thin and rocky soils on steep slopes which show no evidence of past cultivation - have continuously formed 'core' areas for extensive grazing. In the case studies such zones included the higher Lasithi mountains near the Tapes sites, Kritsa Kastello and Anavlochos, and the higher slopes of the Kouroupas massif west of the Frati sites.<sup>11</sup> Large tracts of such core grazing land are present in the vicinity of only some of the defensible sites considered, and never dominate the 1-hour range. These facts suggest that specialised herding is unlikely to have been the strategy around which the move to the new settlements was structured. Specialised herding would need control by a unified community of a very large area of cleared land; it is unclear that any of the settlements considered here, for example, could command this in LM IIIC-PG. Neither are the kind of complex sociopolitical systems needed to facilitate the practice of large scale herding and exchange of its products evidenced for the period (see Chapter 1.5 and Cherry 1988: 22-6).

The defensible character of even small, high-altitude settlements, such as Tapes Epano Kastello, suggests that their main function was not as herding bases. The large size and defensible characteristics of other EIA settlements at high altitudes, such as Karfi and Tapes Kato Kastello, and the absence of a pattern of a suitable number of sizeable, contrastingly-located sites likely to have filled the role of their winter settlements, suggest these were not seasonal or herding-orientated villages, either. Karfi, with its large size, complex constructions (including paved streets and several large buildings, probably with special social functions) and diverse artefact record, has none of the characteristics to be expected in a seasonally used herding site (Murray and Chang 1981; Chang and Koster 1986), despite the claims of Watrous in this regard (Watrous 1977: 2-3). The recent soil study by Morris showed the spread of EIA

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<sup>11</sup> Where Moody has found small EIA sites possibly connected with herding (see next chapter).



pottery over a large area of land in the close vicinity of the site, together with the apparent truncation of the upper layers of a pre-EIA soil surface, suggesting the use of a significant part of the settlement's immediate hinterland for cultivation (Morris 1994). Land potential studies here would almost certainly show adequate agricultural carrying capacity for the population within a 1-hour range of the site, although olive cultivation would have had to take place outwith this range.

The Tapes sites have a large proportion of their hinterland formed by steep, currently eroding slopes of terra rossa soils, with low available nutrients and probably uncolonised for agriculture in the LBA. Bordering on a typical core grazing zone and in an area with a strong historical/traditional role for herding in its economy, they might seem most likely of all the case study sites to have had a substantial herding element in their subsistence regime. The limited capacity for agriculture of the 1-hour hinterland might also encourage alternative strategies. But even though extension of cultivation would necessitate longer journey times, e.g. to the arable of the Lakkonía plain, the wider political and economic circumstances of the period suggest that mixed agriculture with a herding component would be the least risky strategy available to the inhabitants. At both Kritsa and Tapes, however, the adjacent high mountainous zones, where cleared, *were* almost certainly used for herding in the EIA. This is likely to have been the case too at other LM IIIC sites adjacent to typical core grazing zones, such as Erganos Kefali, Karfi, Gonies to Flechtron/Porolios, Mythi Kastello, Males/Christos Schistra and perhaps some of the sites in the east Siteia mountains (Pefki, for example).<sup>12</sup>

Nowicki has observed of Loutraki Kandilioro:

'Kandilioro, like many other sites of this type, was located on the upper edge of the cultivated zone and very close to pastures. This geographical move resulted in an economic shift, namely an increase in the role of herding and exploitation of the mountainous areas. (This was, however, a consequence of and not a reason for the change of settlement pattern at the end of the Bronze Age in Crete.)' (Nowicki 1996: 285; my brackets).

In view of the conclusions from my case studies and the above discussion, this generalisation (based on present day land use divisions rather than on close examination of land potential and land-use history) seems invalid. The arguments of other scholars for an increased or dominant role for herding associated with the settlement shift also fail to convince in the light of the discussion above (Watrous 1977:2-3; Hood and Vlasaki in discussion in Hallager and Hallager, eds.: 367). But LM IIIC archaeofaunal data from various parts of the island,

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<sup>12</sup> See Nowicki 1994a; Nowicki 2000: 131-2; 134-5; 148-52; 143-7 for references to these sites.



discussed in Chapter 1.4, show that sheep/goat herding did continue as part of a broad-based regime.

Delimiting of the 1-hour range showed how closely LM IIIC sites' hinterlands often bordered on or overlapped each other, e.g. in the case of the Tapes sites and of those in the Potamoi valley. From this I infer that regular political/economic cooperation or some form of institutionalised relationship would be likely to exist between sites in close proximity from soon after their establishment. Such relationships would facilitate subsistence activities and help to maintain physical security in the face of threat. Without them, permanent tension would be likely. Inequalities between the productive potential of different sites' hinterlands could easily lead to conflict as expansion of the exploited area was attempted. Use of the mountainous zones for grazing could be another source of conflict, given the lack of large-scale political structures controlling extensive areas of territory.

Specialised economic systems, with settlements in interdependent exchange relationships, are unlikely for the 12th and 11th centuries. The normal risks inherent in specialisation might even be exacerbated through human action, like the raiding of stored supplies or crop destruction, at this time (Jones 1999). The combination of small subsistence territories, absence of political complexity and physical insecurity would make the production of surplus for regular exchange difficult to ensure. An alternative to exchange of produce would be the literal sharing of subsistence territory. For example, the northern slopes between Tapes Kato and Epano Castello and Adrianos Fortetsa, within the 1-hour range of all the sites, would have constituted (if cleared) second-class arable land, but could only have been exploited if negotiation or enshrined power relationships existed between the communities. Similarly, the proximity of settlements at Kritsa Castello and Lato would make economic control of the prime arable areas within a 1-hour range of both settlements impracticable without either full collaboration in land use or politically-established boundaries. Collaboration could have taken numerous forms, and I do not want to imply that it was always consensual. Inequalities rooted in hinterland potential, community size or recent historical circumstances could well have forced one community to accept subsistence collaboration or land-sharing with another. But arrangements might also have involved the extension of kin relations between small settlement units already structured around kin groups (Haggis 1993) or the recognition of dual residence/community membership rights for some individuals. The cluster phenomenon observed at Frati, Tapes and elsewhere seems most likely to have arisen and developed in the context of close collaborative interaction in the subsistence sphere, as well as in other areas of life. The latter almost certainly included defence systems (collaboration in defence seems exhibited very clearly in the Oreino and Monastiraki clusters; see Nowicki 1990).

We should briefly consider the role of the sea in LM IIIC-PG subsistence. Use of fish in the LM III Cretan diet was variable, as seen from analysis of bone development in human skeletons at LM IIIB Armenoi (Tzedakis et al 1999: 212-278). But at EIA defensible sites on or near the coast - Chamaizi Liopetra, Vrokastro, Milatos Kastello, Mirsini Kastello, Viannos Keraton, Arvi, Falasarna, Sellia Kastri, Trachilos Selli and others, established in LM IIIC and used probably until PG times<sup>13</sup>, fishing was probably a regular part of subsistence. Given Crete's relatively small size, EIA inland settlements, never far in walking time from the sea, could also benefit from marine food sources if the political situation allowed easy communication between them and the coast. At Kavousi Kastro, archaeofaunal material shows that a variety of shellfish were consumed (Klippel and Snyder 2000: 68-70). At non-defensible Knossos/Katsambas/Ammisos and Chania, which probably retained their functions as ports, fishing is likely to have played a part in subsistence too (Hallager and Hallager 2000: 193).

### *Conclusions*

While many of these conclusions were expected from the outset, to prove them on a good and wide-ranging basis of evidence was a major reason for undertaking the field studies. It is a lack of detailed hypothesis testing which has led to many of the vaguenesses and misconceptions about LM IIIC settlement pattern and subsistence outlined in Part 1. My main conclusions can be summarised as follows. There was adequate arable land and water accessible from the new sites to sustain their populations on a basis of mixed farming (a reconstruction supported by excavated faunal and botanical data), although carrying capacity was in some cases very limited within the most immediate (1-hour) hinterland, and a wider area was almost certainly exploited. Density of settlement in some areas is likely to have necessitated collaboration and regular contact between communities whose subsistence hinterlands overlapped. Specialised herding, while it might be facilitated by such collaboration, would have required unrestricted access to large grazing territories. Neither the sociopolitical environment nor the dispersed locations of settlement favoured this, and specialised herding is not otherwise indicated by settlement character or patterning, or by limitations in arable hinterland.

While mixed subsistence regimes would have been possible at the studied sites, site location was beyond any doubt *not* geared to facilitate subsistence as a priority. Instead it seems a compromise between defensibility and self-sufficiency, with the former having the more weight in choice of location. The land in the vicinity (particularly the immediate vicinity) of many of the new sites is unlikely to have been used very intensively in the LM IIIA-B period,

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<sup>13</sup> See Nowicki 2000: 139-43; 209; 222 for references to some of these sites.

and probably required substantial investment of time and labour in improvement and planting. In such cases use probably continued, where possible, of previously-exploited prime arable land further away from the settlement. In other cases, the hinterland of a new settlement was nearly identical with that of a pre-existing LBA site, and its previous exploitation gave the EIA community an advantage.

Bailey and Sheridan view territorial analysis as 'essentially a flexible tool', and show that characterisation of site hinterlands should never be the only basis for assumptions about subsistence practice or settlement in the past, nor assumed to have determined certain types of sociopolitical systems (Bailey and Sheridan 1981: 10). My case studies show that the LM IIIC-SM settlement pattern can in no sense be seen as a 'natural' or 'default' one, able to be predicted or explained directly from the subsistence potential of the landscape. Basic subsistence requirements and practices are not likely to have varied dramatically between LM IIIA-B and LM IIIC, but the scale and prioritisation of activities, infrastructure, location of exploited areas and the social and economic relations of the people engaged in subsistence production must have done. Macroeconomic and social circumstances and settlement change at this period combined to produce a new set of conditions into which subsistence production had to fit. The complex changes in the relationship between socioeconomic context, subsistence and settlement which started c. 1200 BC are essential to consider in examining settlement in Crete throughout the EIA. In Parts 3 and 4, my focus moves to the nature of the socioeconomic relations within and between EIA communities, and how they affected and were affected by settlement change.

## Part 3

### Socioeconomic relations and settlement in LM IIIC-PG Crete

#### Introduction

The discussion in Part 3 is based on the study of forms of material culture other than settlement, in conjunction with some general characteristics of the settlement pattern data. Issues discussed are whether a functional hierarchy of settlement can be seen to emerge in the period after the settlement shift, the nature of changes in sociopolitical frameworks accompanying or caused by the shift, and the implications of involvement in a wider, changing economic system for developments within the island between the 12th and 8th centuries BC.<sup>1</sup>

#### Chapter 3.1

##### Beyond subsistence: inter-settlement relationships after the shift

We should approach 12th- to 10th-century Cretan settlement as representing both the cultural outcome of previous sociopolitical and economic developments and an arena for new ones.

Morris suggests:

‘after the fall of the Bronze Age civilisations, the largest Dark Age communities certainly never dropped below 500 members, and probably never below 1000 or 2000. The implications are clear [based on analogies]: permanent social and political hierarchy survived the Dark Age collapse’ (Morris 1991: 43).

The largest LM IIIC defensible settlements appear to represent communities of at least the size suggested by Morris, while some of the continuing, non-defensible settlements, of whose size we are not certain (such as Knossos, Phaistos and Chania) may have been larger. I have already shown that subsistence function was at most only a partial consideration in LM IIIC-PG settlement location, and suggested that mixed farming was the most common subsistence strategy. I also suggested that many sites of this period cannot be treated as fully independent economic or political entities, though it is almost impossible to identify the boundaries of any such units at this time. In many areas the density of sites is such that there would have been

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<sup>1</sup>By the 7th century, the nature of Crete’s interactions with the east Mediterranean was changing again and I do not discuss it in detail. As previously mentioned, the 12th-7th century span of this work is mostly intended to address the links between the Archaic settlement pattern and that of the LM IIIC-G period, and to include the emergence of the *polis* in Crete.

substantial overlaps in their immediate hinterlands. In the characteristic LM IIIC cluster pattern, each settlement may have had its 'own' general area of subsistence exploitation. But the degree of proximity and consequent need for collaborative or land-sharing practices makes it doubtful in most cases whether the elements of a cluster had any hierarchical economic relationship to each other, or could individually bear such a relationship to a settlement outside the cluster.<sup>2</sup>

General analysis of patterns of settlement distribution and size, along with other archaeological evidence, can throw light on whether specialised site function or hierarchy can be identified in LM IIIC-PG. The LM IIIA-B settlement pattern and its socioeconomic context can also be referred to in examining the implications of settlement change c. 1200 BC.

### *Long-term relationships of topography and settlement pattern/size in Crete*

A point touched on in Chapter 1.5 and in the case studies is brought to the fore again here: the effect of wider economic and sociopolitical circumstances in determining Crete's settlement pattern and settlement relationships in many periods, and its counter-balance by an underlying need for dispersed rural settlement and settlement extensions (facilitating subsistence land use). Both Bennet and Moody have identified a tendency to nucleation and to 'primate' settlement patterns in Crete when external domination or the internal hegemony of a single authority is strong (Roman, Venetian, LM III), with a favouring of or 'reversion' to dispersal in conditions of autonomy, e.g. in MM-LM IA (Bennet 1990; Moody 1992). Moody also links nucleated, 'primate' settlement patterns to intra-island conflict, and settlement dispersal to peaceful conditions.<sup>3</sup> I will look in Part 4 at whether the simultaneous growth of a number of nucleations through the PG-A period can be seen as a response to forms of inter-community competition which included conflict. Moody identifies dispersal as always having been the most efficient mode of settlement for agricultural subsistence in Crete, and notes the lack of special natural resources encouraging the concentration of settlement in any particular zone of the island (Moody 1992: 53; see Haggis 1993). However, even the historical/traditional 'optimal' dispersed settlement pattern in Crete has varied regionally and over time in degree of dispersal, according to local topography, land use type, and wider structural factors, as my case studies

<sup>2</sup>This is not the case where there is a great disparity between in size between settlements in a cluster, or when the pattern is of an extended local settlement system rather than a true cluster - e.g. at Karfi, where there are number of smaller defensible settlements (satellites?) at some distance from the large main site. See discussion later in this chapter.

<sup>3</sup>Although this is not supported by twentieth-century examples, where economic conditions have been the dominant factor in the promotion of a few large-scale nucleations.



showed. An inevitable shortcoming of both these general models (particularly Bennet's) is a tendency to gloss the LM III-EIA and the Archaic-Hellenistic periods as single settlement phases, when in reality there seem to have been distinct imperatives operating within each of these periods, marked by 'watersheds' of settlement change. Another is the failure to address the meaning of differences within the same 'type' of settlement pattern identified at various periods. For example, while Moody's attempt to model defensible settlement locations in terms of a similar reaction to seaborne threat occurring in several periods (EIA, Byzantine, Venetian) seems valid, closer examination of the phenomenon suggests that it has very different political and economic correlates in every period, giving rise to different detailed characteristics and very different courses of longer-term settlement development.

The fact that settlement in Crete has moved around a lot through both the ancient and historical periods argues against the idea of any 'naturally'-demarcated or optimum territories. Topography has often helped define political boundaries, but as both Bennet and Moody shows, LM palatial state units, Classical-Hellenistic city-states, Venetian *castellanie* and the modern *eparchies* (district units) varied significantly in their average size and type of topographic definition. All the evidence for the LM IIIC-PG period suggests the absence of very large, formal and coherent political territories, but the inhabitants of individual LM IIIC-SM settlements did almost certainly identify with some kinds of broader regional/topographical groupings. In this study I differ from Bennet in stressing how the roots of C-H *poleis* and the development of political identities around them go back as far as the 12th-century settlement shift. The territories of the *poleis* seem to have much more to do with inter-settlement dynamics starting in this early period than with systemic adaptations to topography and macroeconomic/political factors, as proposed by Bennet. At no time during the EIA-C period can Cretan settlement be seen to simply to 'revert' to a standard decentralised template, as he argues to have occurred after the decline of external (Mycenaean) control of the island by the end of LM IIIB (Bennet 1990: 202).

*The importance of history: Late Bronze Age settlement distribution, function and hierarchy*

In the MM I-LM I periods, Crete seems to have had several layers of settlement hierarchy, strongly tied into political and economic organisational forms (Bennet 1990; Schoep 1998; Chapter 1.5 above). The existence of a number of regional administrative centres is usually postulated. A sub-level of 'villas' - smaller settlements outwith the palatial centres, incorporating both monumental architecture and evidence of texts and administration - had emerged alongside them by LM IA. Bennet argues for a sub-level below this, of small settlements without their own administration system, although the distinction between these and



the villas is not always easy to make in terms of economic/political function, as Schoep points out (Bennet 1990; Schoep 1998). It seems that there must also have been in the countryside a distribution of households or hamlets whose inhabitants were directly involved in farming/herding. The wide distribution of administrative texts among both first- and second-order settlements seems to point to a devolved, rather than single-centred, political/economic organisation: mobilisation and regional redistribution of produce probably involved the second-order settlements very closely (Schoep 1998).

Although the Linear B records have produced a detailed picture of sociopolitical organisation in LM II-III B Crete, archaeology still leaves gaps in our knowledge with regard to the character and function of contemporary settlements. The scattered or ephemeral character of LM IIIA-B pottery deposits on parts of the large LM I sites (e.g. at Gournia, Palaikastro) may well result from the fact that this was the last period of large-scale occupation before abandonment, but may also represent a different form of occupation from the preceding LM I-II. At some sites, such as Chania, Kommos and Malia (Quartier Nu), good evidence exists over a sizeable contiguous area, showing fairly large-scale occupation continuing from LM I.<sup>4</sup> It is clear that a rural site pattern exists for LM IIIA-B which is partly similar to aspects of LM IIIC settlement, with some small-scale nucleation, plus relative dispersal in the areas around the nucleated settlements, probably to facilitate subsistence activity (see below). However, although the sizes of many of the coastal nucleations (Knossos, Chania, Gournia, Malia, Palaikastro, etc) are unclear, much of the island's population must still have been concentrated there. How did LM IIIA-B communities based at these different forms of settlement interrelate? Because of limited archaeological data, this is still under debate. In Bennet's view, 'for at least part of the time (from LM II-III B), the monumental building at Knossos continued to function as the center of an organization run by an elite for the exploitation and possible reciprocal benefit of a hierarchy of lesser sites and individuals: in Aegean terms, a 'palace' (Bennet 1985: 231).

and he characterises the relative status of regional nucleations as follows:

'These had probably stood at the head of their own territories [in the Neopalatial] and were incorporated as pre-existing organizational units by Knossos within its larger, inter-regional area of influence.' (Bennet 1990: 209).

A question still unresolved is whether Knossos functioned as the *only* first-order settlement during any part of LM IIIA-B. The presence of Linear B texts at Chania, and the west Cretan fabric of the inscribed stirrup jars of LM IIIB date found on the Greek mainland, has led some

<sup>4</sup> Watrous 1992; Driessen and Farnoux 1994; Hallager and Hallager 2000.

scholars to suggest that this settlement too had a first-order status, controlling the whole region of west Crete, at least in the period following the 'decline' of Knossos, i.e. LM IIIA:2- LM IIIB (Godart 1992; Godart and Tzedakis 1997). Others see Knossos as retaining prime administrative/economic control over all or most of the island, with settlements at Chania, Phaistos and elsewhere functioning economically and politically as subordinate centres, through the LM II-IIIB period, and date the final destruction of the 'palace' at Knossos in LM IIIB:2 (Bennet 1990, 1992; Driessen 1992). Bennet has suggested that east Crete, where it is difficult to link any known LM II-III site with place-names in the tablets, may have been under an entirely separate, autonomous system of political control (although some of the archaeological grounds for this assertion, such as the lack of LM II pottery in east Crete, have now been removed: see Bennet 1985: 243-4; Bennet 1987).

Outwith the regional centres, a picture is gradually emerging (from recent surveys) of a fairly developed range of settlement types and sizes. A major problem is the differentiation of LM I from LM III surface material (Hayden et al 1992: 334; Watrous et al 1994: 228). Still, a range of distinct settlement pattern elements which probably relate to sociopolitical and economic function can be identified. Hayden has highlighted several dispersed farmstead-sized LM IIIA-B structures in the Vrokastro and other regions (Hayden 1997). The broad chronological designation LM III-EIA used by her survey gives the impression of a cluster of small sites (not all settlements) in the valleys S of Vrokastro through this period (Hayden et al 1992). At Kavousanidas, near Ayios Phainourios E of the Vrokastro area, there is a 'farmstead' of this period. Its location very close to an LM IIIC settlement at Phainourios may be significant, indicating (as at Profitis Elias Vitsiles/Korifi/Rokka) a strong degree of continuity within the same locality between LM IIIB and IIIC (Hayden 1997: 201). At Praisos, a small farmstead/hamlet site at Ayios Konstandinos probably continues from LM IIIB into IIIC (Whitley et al 1999: 235). In the Archanes area, fairly large LM IIIA-B sites at Vitsiles (c. 18 000 sq m) and probably at Archanes are surrounded in the landscape by dispersed individual buildings or hamlets (e.g. at Kamari); dispersed burial patterns in the region may also point to dispersed LM III settlement (Sapouna-Sakellarakis 1990). In the Ayios Vasilios valley survey area, the largest LM IIIA-B nucleation appears to be at Koxare Aloni (c. 20 000 sq m) which co-existed with nearby contemporary farmsteads and small settlement groupings (Moody pers comm; Moody et al forthcoming). In the Mesara, a spread of small settlement, outwith the centres at Phaistos and Kommos, takes place from LM IIIA:2 onwards. The interpretation is of a dispersed rural subsistence 'backbone' for the region (Watrous 1994: 228-9). Medium-sized (small village) settlements are also known from this period, e.g. at Kefali

Chondrou Viannou<sup>5</sup> (c. 3-5000 sq m) and there are larger ones (c. 30 000 sq m+) at Diaskari, and at Ayios Antonios in the Kavousi area.<sup>6</sup>

Differentiated site function within any region in LM IIIA-B is not straightforward to distinguish archaeologically. The apparent restriction of text records to Knossos and Chania<sup>7</sup> suggests that these two settlements had more to do with large-scale administration, including redistribution of produce, than others. Functions as ports/gateways regularly in touch with interregional exchange activity almost certainly applied to the harbours of Knossos (Amnisos, Poros, Katsambas), Chania, and Kommos (Evans 1928: 229-53; Alexiou 1955; Catling et al 1980: 92-93; Hiller 1982; Hallager 1988; Schäfer 1992; Watrous 1992; Watrous 1993: 87-88; Cline 1999). Specialised cult activities were focused at extra-settlement locations like the Psychro, Idaean, Liliano, and Skoteino Caves, Ayia Triada, Mount Jouktas and Kato Simi, Watrous argues that these sanctuaries were attached to particular polities/regional units and that their use was mediated by these structures (Watrous 1996: 108-111; see also Hiller 1997). The farmhouses or very small hamlets must have been involved in the extensive land use we can reconstruct from the tablet records. They and their produce may have been controlled in a feudal-type system based on the regional nucleations. From a social perspective, the settlement pattern seems to indicate that while groups at the smaller regional nucleations and dispersed villages/hamlets might have strong localised/kin based? identities,<sup>8</sup> they also had regular reference to supravening structures of authority and culture based at the pre-eminent settlements.

*Factors probably affecting LM IIIC-SM site size, and patterns of regional variation in size distribution*

A set of categories for LM IIIC defensible site sizes is suggested by Nowicki, in which the largest is a village of more than 1000 people (a 'small town' under Moody's classification) and the smallest is about 50 people (Nowicki 1990: 177; Moody 1992). My charts, illustrating the range and distribution of site sizes at this period (defensible sites only) were based on 49 of 120+ known sites, with an bias in retrieved data towards east Crete (**Figures 3.1-1-3**).<sup>9</sup> **Figure**

<sup>5</sup> Occupied until LM IIIA:2. See Platon 1997.

<sup>6</sup> See Davaras 1973; Haggis 1992, forthcoming for references to these sites.

<sup>7</sup> Tablet preservation is so dependent on hazard that it is still not wise to exclude the possibility of future tablet finds at other LM IIIA-B sites.

<sup>8</sup> Cf. Small's ideas about economic systems on the Greek mainland at this period (Small 1998b).

<sup>9</sup> Most of the published size estimates were independently checked and adjusted where it seemed necessary by the present author.

3.1-2 (sites ranked by size) shows a range of sizes between 42 000 and 600 sq m, which seems to be fairly representative of defensible settlement at this period. The size range is bounded at the top end by settlements which would come under Moody's 'small town' designation. **Figure 3.1-4** shows the map distribution of sites whose size can be estimated, with symbols to represent the different size classes.

The sizes of the non-defensible settlements continuing from LM IIIA-B cannot be securely estimated, but they were probably larger than the biggest of the new sites, considering the spread of non-continuous occupation evidence retrieved from Knossos (Warren 1983; Coldstream 1984b, 1991) and Phaistos (Levi 1955, 1956; Rocchetti 1970, 1974; Borgna 1997). Knossos is estimated in the LM IIIC-SM period to have covered up to 250 000 sq m (Hood and Smyth 1981: 13). These settlements, and Chania, must have represented the largest sites in their regions, as they had done in LM IIIA-B. Nowicki puts the period at which the value of defensible settlement location reached its peak in late LM IIIB or the earliest part of LM IIIC, on the basis of the establishment of the most highly-defensible sites at this time. However, since there is also continued occupation at sizeable, low-lying non-defensible sites into the first part of LM IIIC, it may be that we should either postulate a less overwhelming threat than Nowicki suggests or (more likely) an important function for the latter sites which encouraged their continued use. I return to this point below.

My size charts exclude these (probably) very largest, and the very smallest, sites of the period (since there is not enough research coverage for the island with regard to this type of site). Bearing this in mind, concentrations of sites are seen at around 15-20 000 sq m, although the overall majority of known-size sites are in the category below 10 000 sq m. This indicates a degree of medium-scale nucleation, which seems to represent necessary dispersal<sup>10</sup> to make use of defensible topography, *alongside* the need to make maximum use of such topography. A concern with subsistence self-sufficiency within a limited range seems to have come into play too. I shall discuss the influence of social/political factors on community size later in this chapter.

There seems to be a regional difference between the average size of defensible settlements in the east of Crete (Siteia peninsula) and those in other regions, even though my sample is regionally biased. Most of the sites which can be estimated as under 10 000 sq m in area are located here. This fact seems likely to relate in part to the local topography, characterised by limited pockets of arable with numerous, dispersed water sources (Nowicki

<sup>10</sup> Haggis refers to the EIA pattern at Kavousi as 'a dispersal of nucleated settlements' (Haggis 1993: 158)

1990). Defence-related considerations would also necessitate dispersal (to ensure guarding of the numerous routes into and through this mountainous area) as well as the restriction of settlement to naturally defensible sites (often small rocky knolls), effectively constraining size. However, the existence in this same region of settlements like Kato Chorio Profitis Elias and Azoria (seeing rapid expansion through the EIA and probably already large in LM IIIC) and of Kalamafki Kipia (one of the largest known LM IIIC sites)<sup>11</sup>, shows that where conditions of defensibility and adequate carrying capacity were met, a greater degree of nucleation could occur. These sites could all access large areas of easily cultivable land and dominate major natural routes while still maintaining defensible positions. Sociopolitical factors affecting site size/degree of nucleation might include existing regional identity structures, perhaps relevant in the Vrokastro and Praisos/Kalamafki areas, where there is a significant amount of LM IIIB-C occupation close to a larger LM IIIC site. In such cases, perpetuated community identification with an area might have encouraged a sizeable LM IIIC settlement core to develop.<sup>12</sup>

The Lasithi mountain range, characterised by Nowicki as a kind of ‘refuge area’ because its mountainous and isolated character provided general defensible advantages (Nowicki 1995b, 1998: 45-7) has a full range of site sizes, but a particularly high number of sites in the largest classes (20-30 000 sq m). This does not necessarily represent a substantial change in population from the LM IIIB period (when several large settlements existed around the Lasithi plain). But although we can say that the area in general was well-populated in LM IIIC, this partly arises from the fact that the mountain *flanks* attracted settlement. It is debatable how many of these sites can be linked together as a ‘Lasithi’ group, when in fact from a topographical point of view they might more naturally be included in adjacent regions. It is not clear that the ‘Lasithi’ area formed any kind of political unit at this time.

Turning to west Crete, the Rethymnon isthmus seems, on the basis of present evidence, to have a well-developed settlement pattern within the range of size classes typical of other areas, though the evidence is not enough to allow much comment on particular regional characteristics in size distribution. Given their topography and the spread of surface pottery, the sites at Sybrita and particularly at Veni are likely to have been large in LM IIIC.<sup>13</sup> As elsewhere, we can assume that concern with defensible topography, carrying capacity and the

<sup>11</sup> See Watrous forthcoming b, Haggis 1993: 151; Whitley et al 1999: 238-42; Nowicki 2000: 56-58; 89-90; 99-100 for references to these sites.

<sup>12</sup> This is likely to have applied, too, in other areas where the same settlement focus continued between the LM IIIA-B and LM IIIC periods, e.g. at Profitis Elias Rokka/Korifi.

<sup>13</sup> Current studies at Sybrita should allow a fairly accurate size estimate to be made for the LM IIIC settlement there.



apparent imperative for a degree of nucleation (relating to these and other factors) all played a part in determining settlement size. The far west of Crete has too little evidence to allow detailed comment, but a full range of settlement is hinted at by the contrast between (probably) sizeable sites such as Eleutherna and small to very small ones like Rokka, Ghribiliana and Hosti.<sup>14</sup>

In central Crete, many defensible sites were probably already large in LM IIIC-SM, although they grew over the course of the EIA. Most would appear to have been fairly evenly-matched in size, but later evidence obscures too much to be sure of this. Views between them are long and uninterrupted, and access to and control of the large areas of valuable cultivation land could be relatively easily achieved. The main natural routes across and between the Pediada and Mesara plains noticeably have sites at strategic points. Most sites in the region could support large populations while still occupying defensible positions. Their locations, though, are mostly defensible only by virtue of these same strategic characteristics, and when in use by a large number of people. The use of these sites, then, was at least partly dependent on sociopolitical and demographic factors. The concentration of population of which existed in central Crete already in LM IIIA-B (at Knossos, Tylissos, Phaistos, Kommos, Archanes and other large sites) is likely to have affected the density and size of settlement there in LM IIIC.

There are several significant differences between the large settlements of the central Cretan and Lasithi regions, although every site provides a substantial settlement area in a very good defensible location. The Lasithi sites<sup>15</sup> tend to have more intrinsic, as well as strategic, defensibility, (although their intrinsic defensibility is sometimes artificially enhanced, as in the case of Kritsa Castello's fortification wall). Also, most of the large Lasithi sites do not outlast PG, while those in central Crete continue to flourish. This indicates that the factors affecting settlement location in the post-PG period are much more complex than defensibility or simply room for expansion of the settlement area on the same site (see Part 4).

### *Population and movement*

In estimating population size for sites known from survey only, I use the general rule suggested by Nowicki for agglomerated LM IIIC-SM settlement, as outlined in Chapter 2.1. This method needs to be used with caution in cases where architecture does not appear to be continuous over the site. There is clearly variability in building density between, for example, Thronos Kefala,

<sup>14</sup> See Stampolidis 1990; Vlasaki 1991; Nowicki 2000: 193-4 for references to these sites.

<sup>15</sup> E.g. Karfi, Tapes Kato Castello, Erganos Kefali, Loutraki Kandilioro, Kritsa Castello.



Kavousi Vronda and Karfi. At spacious central Cretan sites, such as Prinias, fairly large gaps between buildings may have existed in LM IIIC/SM, although the destruction of the architecture by later EIA occupation makes this difficult to determine (Rizza 1983).

Nowicki has suggested possible depopulation of Crete in early LM IIIC, based on a perception of fewer sites in this period than existed by later in the 12th century. This idea fits well to his reconstruction of a disturbed and threatened populace at this time (Nowicki 2000: 228; Nowicki pers comm). The first occupation of a number of defensible sites can now be dated to the transitional LM IIIB/IIIC-early LM IIIC period, and these are sometimes small, e.g. Kavousi Kastro, Monastiraki Katalimata. But we must also take account of the occupation in early LM IIIC of many other sites, including the large acropoleis of central Crete (dated from early IIIC by Nowicki himself). We should consider as well the continued occupation in LM IIIC of some large existing sites such as Knossos, Phaistos and Chania. Both the above types of site would be topographically defensible only by a large number of people, or the construction of fortification walls. Their use in this early period, then, suggests that Crete may actually have been fairly densely populated, although of course we do not have a clear idea of LM IIIB population sizes, and some depopulation may already have taken place by the beginning of IIIC. Even given the large amount of settlement data, it is still not possible to say whether the LM IIIC population attained anything like Crete's historical average of 200-300 000 people.

Immigration to Crete is also often argued to have taken place during the course of the 12th century. It really needs to be discussed in the context of artefact studies, and I address the question in the next two chapters. While, superficially, a settlement shift as radical as that of LM IIIC might support the notion of large-scale immigration, this would imply (since the change was so sweeping and so consistent) a widespread replacement of population, which is by no means visible in the material culture record. Neither settlement plans nor individual structure types show features which did not already exist in pre-LM IIIC Crete, and which had already been integrated into Cretan culture (Hayden 1993). Thus, if we still favour immigration at this period we must suggest either pre-existing/very rapid cultural integration,<sup>16</sup> or a very small total number of immigrants.

#### *Evidence for differentiated site function in LM IIIC-PG*

<sup>16</sup> A high degree of cultural integration for incomers coming from elsewhere in the Aegean might not be surprising, however, given the broad similarities in LBA Aegean material culture.

Although we have a good knowledge of 12th-11th-century defensible sites from survey, too few have been excavated to allow a typology of site functions to be identified, although some attempts have been made to grade sites in terms of defensibility (Nowicki forthcoming b; Watrous forthcoming b). Otherwise, functional size differentiation (functional size being defined by Johnson as 'the number of different kinds of activities undertaken within a settlement, encompassing all the political and economic relations between any settlement and other(s) around it' (Johnson 1977: 198), cannot be very clearly seen. We have seen that a full range of site sizes exists across the island, suggesting a complex set of relationships, but that there is no clear regional distribution of larger defensible settlements likely to have acted as local centres (Smith 1976; Haggett 1966). The distribution of sites and of their relative sizes does not obviously conform to any pattern based on resource access or central places. Geographical distinctions in settlement distribution and size seem most likely to arise from a particular combination of choices made with respect to defensibility, subsistence, demography and the character of the social unit (perhaps relating to the history of sociopolitical organisation in a region). A few elements of specialised function or unequal relationship may have existed, which we can explore here.

#### Non-defensible agricultural hamlets - extension of the cultivated zone

Survey data, as discussed above, indicates the existence of dispersed small-scale settlement, apparently connected to efficient land use, continuing from LM IIIA-B through the EIA, and this was supported by the results of the present studies. At Anavlochos and Chamaizi Liopetra small EIA-C sites are located about half an hour away from the main settlement. I listed some other EIA examples above, including the Ayios Vasilios valley, where the sites at Angouseliana, Nea Atsipades Bali and perhaps Koxare Ambelos represent non-defensible, small EIA site dispersal around Frati Kefala and Atsipades Fonises (Moody pers comm, Moody et al forthcoming). A small non-defensible site at Manoulis' Metochi, in the area of Praisos, may well have an agricultural function during the period of use of Kalamafki Kipia (Whitley et al 1999: 246). A well-researched example of dispersed LM IIIC settlement around a larger nucleation is the Karfi grouping, including Krasi Siderokefala and Kera Kastello, long attributed by Nowicki to extended land use on the lower hillslopes north of Karfi. However, these sites are all defensible, and thus have more complex relations and functions. The need for extension of settlement may have become more common through the PG-A periods as economic territories expanded and threat reduced (see Chapter 4.1). This LM IIIC pattern of small sites is very similar to the LM IIIA/B one of dispersed farmhouses/hamlets. It differs mostly in that

the small sites relate closely and immediately to new medium-sized settlements at defensible locations, rather than being the lowest level in a complex hierarchy covering an extensive area.

### Herding sites

A dominant role for specialised pastoralism in the 12th- and 11th-century economy was suggested as unlikely in Chapter 2.4. While study of traditional and modern pastoralism in Greece shows that there are many potential variations on the Ano-Kato system (e.g. Koster 1997, Chaniotis 1999; Chapter 1.5), neither the character of settlements nor their distribution in LM IIIC-SM fits a model of seasonal occupation. However, examples have been noted by Moody of EIA single-building sites or very small pottery scatters in mountainous areas, where extensive herding, involving extra-settlement residence, may have been part of the subsistence regime. These are the Sfakia Madares (historically and currently a very extensive grazing zone), and the Kouroupas massif, both in west Crete (Moody pers comm). The sites require further investigation.

### Symbolic functions in the landscape

Recent approaches to cultural landscapes have shown that some dramatically-situated and highly visible ancient sites often had an important sociopolitical symbolism (although many of the examples discussed are connected also with ritual, and are monuments rather than settlements; see Tilley 1994: 86-99, 109, 142, 204-207; Ashmore and Knapp 1999; Gaffney forthcoming). High visibility/impressive location may be particularly important in periods where (as here) existing power systems focused on large nucleated centres have collapsed, and a large part of the population is dispersed to new sites. The need to establish new territorial rights and community identities may in some cases be strong enough to favour the location of settlement on seemingly 'impractical' sites, perhaps not most conveniently situated for subsistence needs. However, though some defensible sites (e.g. Kavousi Kastro, Tapes Epano Kastello, Karfi, Elliniki Korifi, Frangokastello Kastri) do have visually dramatic/potentially symbolic characteristics, this can have been at most a dual, if not subsidiary, factor in choice of location. Defence was the most consistent priority across LM IIIC-SM Crete, as shown by fortifications on other, less dramatic sites (walls of rough, pragmatic rather than monumental construction<sup>17</sup>). (Platakis 1970; Hayden 1988; Nowicki 1992b; Kanta and Stampolidis forthcoming). A significant number of the new sites are *not* dramatic in appearance or

<sup>17</sup> See Koehl and Schilardi forthcoming for ideas about the status symbolism of high-quality fortification walls, like those at LM IIIC Koukounaries (Paros).

extremely obtrusive from a distance (though still defensible). So if the sites are to be 'read' in a symbolic way, we must postulate a complex system of meanings and functions for them which still remains to be elucidated.

Whitley argues that Praisos was chosen for PG and later settlement partly because its three-hill form resembled the topography of the nearby LM IIIC settlement at Kipia, abandoned from the same date (Whitley et al 1999: 251). However, other characteristics shared between Praisos and the many settlements which parallel its development in PG-A suggest that the choice had more to do with a wider, complex phenomenon of change than with the specific, locally-based visual symbolism Whitley suggests. Nonetheless, the set of factors driving this change almost certainly included concern with visually reinforcing emergent political identities at the expanding nucleations (see Part 4).

Arguments for the social significance of visually prominent locations for LM IIIC settlement may be supported by a predicted need for new forms of local/regional identity after the collapse of larger-scale LM IIIA-B legitimising structures. Groups (extended kin-groups?) within a settlement cluster, as at the Kavousi sites, or in the group of sites around Tapes and the Potamoi valley, might relate to a wider collective structure through reference to visually dominant points like Kastro and Epano Kastello. It is significant that these sites are relatively small but still bigger than mere watchpoints in a defensible system - they are normal settlements which may have an added functional dimension enhancing their attraction as habitation areas.

### Cult places

Important LM IIIC cult sites are known at, among others, Kato Simi (continuing from LM IIIA-B and earlier, and in use throughout the periods up to H), the Psychro cave (again continuing from LM III A-B and earlier through O), the Idaean Cave (LM IIIC-C), the Patsos cave (beginning in LM IIIC but used into C), and the Tsoutsouros cave (LM IIIC-A).<sup>18</sup> Separate, institutionalised cult places within settlements were well-established from LM IIIC onwards (*contra* the situation on the mainland, discussed in detail by Mazarakis- Ainian 1997). They include small settlement-level shrines in villages like Kavousi Vronda and Monastiraki Chalasmeno, and more complex settlement- or regional-level shrines serving a larger

<sup>18</sup> Kanta 1991; Rutkowski and Nowicki 1996; Watrous 1996; Sakellarakis 1982; 1987; Kourou and Karetsou 1994; Alexiou 1963.

population, but still based in a settlement or closely connected to a settlement (e.g. at Ayia Triada, Vasiliki Kefala, Karfi).<sup>19</sup>

All the extra-settlement cult locations I have mentioned above lack associated settlement evidence, and thus appear to have maintained a specific function. They are in areas where a network of defensible sites could have made use of them, with the Patsos cave lying adjacent to a major route across the island. Alongside their sociopolitical roles, they may have functioned in an economic dimension, through serving a number of settlements and promoting a variety of social interactions. I agree with Watrous that the structural context of use of these sanctuaries was almost certainly different than it had been in LM IIIA-B, especially since there are no clear candidates for LM IIIC-SM regional authority centres through which they could be maintained/controlled (Watrous 1996: 100-2). It is probable that the use of shared sanctuaries related to the definition of new regional identities during this period. It is interesting, though, that both recent (LM IIIA-B) history, *and* new forms of community interaction and identity were clearly relevant to the continued use of the sanctuaries: some concepts of wider regional identity vested in their use may even have been partly perpetuated from LM IIIA-B.

The rise of public sanctuaries in 8th-century Greece as a alternative arena for elite competition, developing in reaction to unsustainable competition between elites through personal wealth accumulation, has been discussed at length (Hagg 1983; Morris 2000; Morgan 1993, Sourvinou-Inwood 1993; de Polignac 1995; Chapters 3.2 and 4.2 below). The importance already in the 12th to 10th centuries both of regionally-shared cult places and smaller, separate settlement-level cult institutions in Crete may relate to the somewhat conservative sociopolitical trajectory followed by the island in the EIA, a subject discussed in the next chapter.

### Gateways for long-distance exchange<sup>20</sup>

The importance of exchange with the outside world for various social and economic developments in EIA Crete will be looked at in more detail in the following chapters. The Hallagers suggest that a general decrease in the importance of external trade caused the abandonment or decline of former major trading centres like Chania during LM IIIC (Hallager and Hallager 2000: 193). The abandonment of other gateways, like Kommos, at this time seems to confirm a decline in the value of such contacts to people living in Crete. Looking at both defensible and non-defensible sites in the LM IIIC-SM period, however, it appears that

<sup>19</sup> See Rutkowski 1987; d'Agata 1998; Eliopoulos 1998, forthcoming.

<sup>20</sup> See Hodges 1982 for a good discussion of the socioeconomic role of gateway communities.



some sites are still likely to have served as exchange gateways between the outside world and communities in the interior of the island. Knossos shows through its LM IIIC-SM artefact record that contacts with the outside world were maintained through the period (see the next chapter and Coldstream 1991; Coldstream and Catling 1996; Warren 1997). Katsambas and Amnisos were probably the main port areas for Knossos (Alexiou 1955; Schäfer 1992). Chania, where occupation may actually be continuous into at least the G period, probably retained a similar function.<sup>21</sup> Kommos, although undoubtedly abandoned in LM IIIC-SM, is definitely back in use as a port by the late 10th century.

Though low-lying, non-defensible sites with access to established natural harbours probably continued to have a role as gateways, their character and importance must have changed in various ways between LM IIIB and IIIC, as the decline of Chania and Kommos clearly shows. Possible forms of interaction between the suggested gateways and defensible settlements in the interior of the island will be discussed later in Part 3. Sites like Vrokastro, Chamaizi Liopetra, Mirsini Castello and Palaikastro Kastri are likely to have had a function primarily of coastal defence, but their positioning (whether or not their inhabitants were 'pirates' or of origin external to the island and isolated from the local population (as suggested by Karageorghis 1998, forthcoming; Nowicki 1987, forthcoming b) must have allowed them, too, to participate in economic contacts outwith the island.

### *The importance of routes*

Aside from defence, and from defence-related communications, Crete's natural routes have always facilitated intra-island and external exchange, as well as the exploitation of a wider hinterland by centralised settlement (for the Bronze Age, see Evans 1928: 71-75; Pendlebury 1939: 7-16; Tzedakis et al 1989; Tzedakis et al 1990; Kanta 1994; Sakellarakis and Sakellarakis 1997: 72-73). LM IIIC-SM defensible settlements very often appear to be located with a distinct regard to natural routes (Hayden 1992: 328). The defensible settlements in mountainous zones are nearly always sited on valleys leading into the interior of the range, e.g. Erganos Kefali, Karfi, Kavousi Kastro, the Potamoi and Oreino valley sites. In other areas sites dominate major routes connecting different parts of the island, e.g. Axos, Eleutherna, Kalamafki Kipia, Vrokastro, Frati and Sybrita. As I shall discuss in Part 4, route control, with regard both to defending and to expanding territory, seems to have been an increasing

<sup>21</sup> Hallager and Hallager 2000: 193 suggest complete abandonment from LM IIIC-G. This is certainly the case for the Kastelli area, but our archaeological knowledge on the whole area of the present city is not enough to draw definite conclusions on this point.



preoccupation for the nucleations of the PG-A period. While defence was probably the main factor in location close to routes in LM IIIC, other considerations must also have influenced this siting, including involvement in exchange. The concern with the defence of entry points from one area into another supports the idea that some kind of definition of territories or collective identities at a supra-settlement level had emerged as early as LM IIIC, although probably at quite a small and still-flexible scale.

*The sociopolitical dimension of inter-settlement relationships - changes between LM III A-B and LM IIIC*

I will explore EIA society in Crete in the following chapters. Here I want to address only the likely effects of the LM IIIC shift on the sociopolitical framework which had previously supported settlement relationships. Since settlement functions had previously been closely integrated with economic and political organisation, the shift must have caused significant disturbance to this organisation. However, it also represented a deliberate set of actions, in themselves probably associated with a degree of political readjustment.

Can we see any kind of link between the LM IIIA-B framework of settlement and the new LM IIIC sites? In some cases, there *are* signs of direct movement to sites in the very close vicinity of LM IIIB nucleations (Asari Kefala (from Gournia), Mirsini Castello (Mirsini tomb area/Chalinomouri)<sup>22</sup>, Profitis Elias Rokka/Korifi (Vitsiles), Karfi (Tzermiado Ayia Anna),<sup>23</sup> Palaikastro Kastri (Palaikastro Roussolakkos – this last apparently a short-term move only). However, in many cases this pattern does not apply, and we observe the general dispersal of settlement well away from previously important locations. There are few possible LM IIIC-SM parallels to the large regional nucleations of LM IIIA-B. The change was profound enough to permanently break the ties which had formerly bound people to these centres: fragmenting and dispersing their populations, it negated many of their functions. Continued occupation at the most important - Chania, Phaistos, Knossos - may have been a basis for maintenance of some identity ties with them by new, dispersed communities in their regions. However, their previous supporting systems of smaller settlement were so changed by the shift that regional political identities and inter-community economic attachments must have quickly started to develop along new lines.

<sup>22</sup> See Kanta 1980: 163-73 (the cemetery must relate to a nearby settlement); Davaras and Soles 1996 (the remains referred to here are LM IB, but the excavators have since recognised LM IIIA-B material (Soles pers comm; A. Smith pers comm)).

<sup>23</sup> See Nowicki 1998.

On the Greek mainland, the implications of the collapse of centralised sociopolitical and economic systems have recently been modelled by Small and by Foxhall. Instead of a full political/economic hierarchy in LH IIIB, Small prefers to see a set of fairly autonomous lineages, engaged in their own production interests and paying only taxes/tribute to the palatial centre, the latter having direct control only over its owned (limited) lands (Small 1998b). He argues that after the systemic collapse c. 1200 BC these lineage groups survived fairly well, and could even improve their economic situation. Paying particular attention to settlement location, Foxhall has noted that previously subordinate regional settlements seem to show the best signs of recovery in the post-collapse period. She attributes this to the increased freedom of these communities to develop in the absence of centralised control<sup>24</sup> (Foxhall 1995: 243). She argues that the most successful were well-removed *spatially* from the old centres and thus avoided entanglement in the physical ramifications of their decline.

I have noted above that in LM IIIA-B Crete, too, a degree of social and political autonomy seems to have operated at regional level. The (semi-) autonomous unit seems to have been something between independent individuals (lineages?) and delegated personnel controlled by a central institution. It is clear from the 'collector' references in the tablets (see Chapter 1.5) that a fairly large number of people were allowed to derive personal benefit from the production they supervised, although the geographical range of reference in the economic documents from Knossos suggests a more than tangential interest by the main centre(s) in regionally-based production.<sup>25</sup> In LM IIIC, the question is of how far existing semi-autonomous entities could continue with what they were doing in the conditions of settlement shift and the security/authority vacuum created by the collapse of the central administration.

Like Small and Foxhall, I believe existing structures of localised autonomy would provide the best basis for successful development of new economic systems in the 12th-century Aegean. But the particular settlement circumstances in Crete make it impossible to apply the model to the island unmodified. The spatial range of relocation of the population was much smaller here, and the use of the largest prime arable areas in the coasts and lowland plains may have declined, but could not afford to be wholly abandoned in LM IIIC. Continued occupation at some of the previously most important centres was significant. So pre-existing relationships

<sup>24</sup> The after-effects of collapse preventing revival at the old centres.

<sup>25</sup> The existence of a feudal-type system should not be discounted on the basis of the high level of detail in the central records, though, given that mediaeval feudal systems in Crete also used very detailed central accounts. This is *contra* Killen 1985, who argues that the amount of detail in the records reflects very strongly centralised control of all economic activity. See Gasparis 1997 on the documentation of Venetian feudal systems.

were likely to have been more of a conscious issue in Crete than elsewhere. At the same time, few if any of the smaller centres continued in use, and the break was in this way much more dramatic than on the mainland - there was little chance for autonomous groups to remain *in situ*. Special factors, particularly defence, prevailed in the location, expansion and longevity of new settlement in Crete, and these changed during the course of the EIA. Defensible location was apparently not a priority on the 12th- to 11th-century mainland.<sup>26</sup> So it appears that Foxhall's generalisation cannot be applied to Crete:

'How any particular site, town or region fared, and developed, after the dismemberment of Mycenaean administration (however that happened) seems to depend largely on what its earlier relation had been with the nearest palace' (Foxhall 1995: 247).<sup>27</sup>

If the previously semi-autonomous groups would be least disturbed by the changes c. 1200 BC, we might expect some elements of their social relationships to be carried on in the post-relocation communities (Foxhall 1995: 247). People who had been in positions of regional-level responsibility, e.g. concerning the collection, storage and recording of produce, might *remain* invested with authoritative qualities. They might also retain intact some of their established exploitation rights in certain areas, and some of their moveable wealth. It seems unwise to predict too much social or political continuity between the 13th and 12th centuries in Crete, though, as I have already outlined. The collective psychological/social adjustments required by the changing circumstances means even these groups would have faced many challenges to their existence and activities.

The degree of nucleation in LM IIIC settlement certainly relates to defensible topography, but may also have involved the reproduction of some LM IIIA-B forms of sociopolitical cohesion. As Morris observes (see the beginning of this chapter), it is necessary to postulate some forms of beyond-family social organisation when a significant number of settlements have populations of over 1000. An important form in binding the LM IIIC-SM communities internally, and in negotiating relationships between them, may have been newly-emerging definitions of 'local'/'regional' identity, perhaps making use of kin-based terminology, shared sanctuaries, and other cultural forms (see Haggis 1993; Hall 1997; Morris 2000, and the following chapters).

<sup>26</sup> The settlement pattern in mainland Greece in the period soon after the collapse of the palatial system is less well-known than for Crete as a whole, but it seems that there was no widespread and overwhelming move to defensible settlement locations (as has proved to be the case, for example, on many of the Cycladic islands). This remains to be fully proved, however.

<sup>27</sup> We can equate the concept of 'palace' here with the main settlement centres in LM IIIA-B Crete.

*Summary: relationship of resources, topography, communication, and sociopolitical structures to LM IIIC settlement*

A pattern recognisable throughout the island at this period is the dispersal of defensible settlements of up to a maximum of 30-40 000 sq m in size. Size limitation seems to refer directly to defensible topography, but also to the absence of a complex economic structure, and consequent unwillingness/lack of incentive to exceed self-sufficiency within the close hinterland of the settlement. Johnson suggests that where resource disparity is minimal, dispersal may be consciously selected to minimise the impact of production variability across a settlement system, i.e. to risk-buffer (Johnson 1977: 490-492). With the collapse of specialised labour structures and redistributive systems at the turn of the 12th century, a desire for community self-sufficiency in LM IIIC is unsurprising. However a number of LM IIIC sites represent deliberate nucleations of up to 1000 people or more, and the combination of nucleated and dispersed elements in the settlement pattern suggests that explanations of settlement size patterning and development focused only on subsistence resource distribution or hierarchical function are unsatisfactory.

Contrasting the settlement pattern of LM IIIC-SM with that of LM IIIA-B, we see that a previously-existing regional and functional hierarchy, once collapsed, could not have re-emerged. Knossos (and probably Chania) had been highly centralised cores in LM IIIA-B: the inefficiencies of political and economic organisation arising from this encouraged the involvement of regional groups or other fairly autonomous community forms in various types and levels of production, subjugate to centralised control. Without primate controlling centres in LM IIIC, a lack of need for regional functional centres and a broader equivalency between settlements would be expected to obtain, and this seems to be what we find. The necessity of collaboration between closely adjacent settlement units, particularly within clusters, may have been partly responsible for producing new kinds of social bonds. However, we should avoid arguing that new sociopolitical systems were simply adaptations to subsistence realities. Social change had its own dynamics during this period and was affected by a variety of factors within the island, as well as in its wider region. In the next chapters I will try to reconstruct in more detail the social systems of the 12th to 11th centuries.

## Chapter 3.2

### Social systems and structure in 12th- and 11th-century Crete - material reflections and dynamics in social change

#### *Approaches to EIA economy and society*

Models of economic rationality have long been shown to be inadequate to describe the sort of transactions going on in ancient societies (Weber 1947: 112-24; 158-64; Sherratt 1993: 127; Trigger 1998: 180-2; Dalton 1968, 1969; Bourdieu 1977). But substantive/adaptive models are clearly unsatisfactory in explaining the development of socioeconomic relations in the rapidly changing Aegean EIA context, where engagement in interregional exchange plays a crucial role. However, while recognition of the importance of long-distance 'commercial' trade in the period has proved an enlightening basis for interpretation of sociocultural change at this period, even those who most stress the role of increasingly freed-up, profit-driven economic activity through the EIA acknowledge that exchange activity continued to take place in a variety of social contexts (Liverani 1987; Sherratt and Sherratt 1991, 1993; Sherratt 1994, 1998). We still have to be careful to avoid producing either over-socialised models of economic relations on one hand, or 'metanarratives of the origins of capitalism' on the other (Humphreys 1978: 162; Morris 1999: xxviii-xxxi). For example, although the notion of elite gift exchange has been vital in exploring EIA societies, a better understanding of the role of non-elite/non-gift-based exchange is clearly needed, as the Sherratts' work has recognised. Without examination of the full range of types of socioeconomic interaction, it is impossible to discuss power relations, their reproduction and transformation. It may be helpful in this regard to pay more attention to the contexts of production, as well as consumption, of exchange goods.

Perhaps the most useful distinction to bear in mind in examining EIA society is that made by Bourdieu, between systems where all exploitative relationships need to be constantly renegotiated within the social, and those where a level of institutionalisation has been reached which allows formal, permanent affirmation of economic relationships (Bourdieu 1977: 159-97). In both types of system, economic rationality and aggrandising motives exist, but are differently affective. Since the Aegean is by no means institutionalised in its sociopolitical structure at this time, it appears that we should see it rather more in terms of the first model. At the same time, I will argue, early forms of institutionalisation appear in EIA Crete which relate to a need to socially re-embed an increasing amount of aggrandising activity, and these form the basis for the steady development of socioeconomic complexity throughout the period. I recognise an important role for competitive, aggrandising economic action in changing Cretan



society, but observe that particular forms of social relations in turn stimulated this kind of action and modified its impact.

The contingent, dialectic nature of the relationship between interregional exchange activity and internal societal change at this period means that models of exchange economy which assume fixed systemic relationships over large geographical areas, like that recently outlined by Jones, have very limited value (Jones 1999). More valuable tools in this respect are forms of world-system model (Chase-Dunn and Hall 1993; Sahlins 1982; Sherratt and Sherratt 1993). Social and economic change in EIA Crete cannot be understood without reference to the contemporary world-system of which the island formed part. However, explanation of the elements of difference between Cretan developments and those in other areas requires close attention to be paid to the particular framework of social development in the island (Cherry 1999).

The conclusions I have already drawn about EIA subsistence are a good starting point from which to explore society - particularly useful in assessing the likely role of managerial, as opposed to aggrandising, forms of economic activity in constructing social relations (Trigger 1998: 216-7; Shennan 1993: 56). I also look here at how social systems changed and were changed by settlement development. To date, the predominant emphasis of studies of EIA Aegean society have been on mortuary data and symbolic systems, tending to isolate small units of meaning,<sup>1</sup> although some address a variety of archaeological sources, including the settlement record (e.g. Morris 1991, 1998: 94-5; 102-3; Snodgrass 1991; Whitley 1991b; Donlan and Thomas 1993; Haggis 1993; Foxhall 1995; Mazarakis-Ainian 1997). Such wide-ranging approaches are, in the absence of texts, one of few routes to greater understanding of EIA social organisation. Still, though, many studies seem unnecessarily restricted to the most obvious routes into the social sphere. Although Whitley recognises the need to study regional social contexts through a variety of evidence forms, he shows the main orientation of his study clearly: 'What matters is not the fact that different traits are to be found in different regions, but how these traits are related to each other in particular, local *symbolic systems*.' (Whitley 1991b: 346; my italics). Although he tries to use Cretan settlement evidence to reconstruct social systems, his theorisation of settlement is, to say the least, incomplete, a point I shall return to later. As we have seen, the settlement data for EIA Crete is now so extensive that an attempt to fully theorise and use it on a detailed comparative basis to examine society seems required; Haggis and Whitley's papers were the first to recognise this. Analysis of some aspects of burial data relating to social differentiation is also undertaken here: the combined

<sup>1</sup> See the comment of Shanks 1996: 140-2.



analysis of both types of data on an extensive basis has not so far been undertaken for Crete in this period.

*Narratives of EIA social development and the evidence base.*

Although use is often made of the theory of a 'power vacuum' to postulate social fragmentation post-1200 BC (e.g. Mazarakis-Ainian 1997: 375; 381; Morris 1998: 104; Foxhall 1995), the years since the publication of Desborough's and Snodgrass's books have seen great interest in trying to *positively* reconstruct EIA society (e.g. Qviller 1981; Morris 1986, 1987, 1989; 2000; Whitley 1991 a, b; Mazarakis-Ainian 1997; Antonaccio 1995). Many narratives of social development focus on the importance of personal competition in the form of gift exchange and aggrandising, elite-initiated economic activity in the 12th to 8th centuries (e. g. Finley 1979; Qviller 1981; Coldstream 1983; Morris 1986, 1989: 513-4; Donlan 1994). They are based on analysis of the Homeric texts in conjunction with archaeological evidence for the fairly small-scale, long-distance movement of high-value goods, and are supported by anthropological examples of big-man societies or chiefdoms in which rank is partly achieved or needs to be regularly negotiated through this type of exchange. Change in social systems in many parts of the Aegean is suggested to have taken place again from at least 900 BC. While hypotheses of population growth and/or changes in warfare technology as the major impetus in this have been influential in the past (Snodgrass 1971, 1980a; Qviller 1981), most recent, structurally-orientated analyses have stressed stimulation by increased access to high value goods originating from Cyprus and the Near East. This is suggested to have disrupted fragile wealth-based competition systems, resulting in the emergence of various forms of social institutionalisation, and eventually in something like secondary state formation (Morris 1987, 1989: 513; 1998: 100; Kopcke 1990: 106-7; Sherratt and Sherratt 1993: 369<sup>2</sup>)

Both Morris and Haggis have recently pointed out that the characterisation of many Aegean societies during the course of the EIA as non-complex or as limited in complexity does not fit unilinear evolutionary models, and argue that particular restricting factors were in force on 'classic' types of complexity development (these varying significantly from region to region: see Morris 1998; Haggis 1999). The regionally variant development of EIA social systems led in turn to the emergence of several variations on the form of the (*polis*) state by the 8th century.

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<sup>2</sup> Though the Sherratts' view is of a world-system, they place such emphasis on the transformative effects of trade, emanating from the east Mediterranean 'core' and eventually giving rise to a process of Aegean development and exploitation of the west Mediterranean area, that it is difficult to escape the links to secondary state models.

However, Aegean *polis* emergence is recognised as having occurred in conjunction with the rise of a consciously Hellenic ethnic identity and through the regular cross-regional sharing and adaptation of various sociocultural elements (Hall 1997: 44-7; Morris 2000:251-61). So elements of (diffusive) process are apparent. Contemporary *consciousness* of change in sociopolitical systems and their deliberate management is clearly an important factor in developments.

Despite the recognition that evolutionary models fit badly to the case, Donlan and Thomas, in an analysis based both on settlement patterns and on Classical texts, claim what seems suspiciously like a three-stage evolutionary process for the EIA Aegean, although they acknowledge the existence of two variant outcomes of social change - oligarchy or monarchy - which echo Morris's 'agro-literate' and 'citizen' types of *polis* state (Donlan and Thomas 1993; Morris 1998<sup>3</sup>). They suggest that 'big-man' societies prevailed from the 12th to 10th centuries, with a general absence of wider clan ties linking small groups. This is suggested to have gradually given way to a 'pyramidal' system of ranked chiefs, with ranking tied to lineage, and finally to state forms (see, for a similar model, Ober 1989). Problems with this model are that the stimuli to transition are not explained; the jump from a complete absence of clan linkages to a lineage-based system is difficult to conceptualise (Yoffee 1993: 65). While the authors emphasise the lineage basis of the 'monarchic' *polis* form,<sup>4</sup> they do not explain the different dynamics of emergence between this and the oligarchic one. Mazarakis-Ainian, too, represents the development of larger scale social units with complex organisation by the G-A period in a way which sees social development as merely a reflector of unexplained, empirically-defined, happenings - settlement nucleation and expansion which occurred as 'the natural course of events' (Mazarakis-Ainian 1997: 382). As Haggis notes, it is no longer enough simply to describe or identify ranking or changes in it using the archaeological record or historical texts: outside evolutionary models, description of social systems will not tell us in itself about the forces behind change or structural variation in EIA societies (Haggis 1999: 306).

Morris and Whitley have both produced detailed narratives (which include explanations for change) for society in EIA Greece (focused mainly on Athens: Morris 1987, 2000; Whitley 1991a). Inevitably, social developments in Crete are generalised to a considerable extent in these works. Morris notes the significance of 'continuity in ritual practice and house forms', alongside consistent variability in burial assemblages, in Crete,

<sup>3</sup> He adapts these models from Gellner 1983.

<sup>4</sup> As does Morris for his 'agro-literate' *polis* type.

linking the latter to the geoeconomic status of the island, which prevented the development of the kind of strong social control over supplies of value goods seen in Athens (Morris 1989: 514; 1997: 42; 1998: 101). Whitley, too, attributes Crete's differences to the effect of proximity to the east Mediterranean area - i.e. consistently greater physical access to high-value imports than was the case in other Aegean regions (Whitley 1991a: 186-7). In another study of EIA society, Mazarakis-Ainian several times raises the issue of Cretan divergence from the rest of the Aegean in the sphere of cult practice. But in line with the generalising approach of his study, he prefers to downplay this element, only going so far as to say that different social systems must have existed in Crete, without trying to explain them (Mazarakis-Ainian 1997: 377-9). It thus appears that EIA Cretan society deserves its own narrative: specific features of the archaeological record need to be assessed through analysis of the local social context, with the use of an appropriate time-depth and a range of evidence types.

#### *The relationship of settlement to social forms in EIA Crete*

I would like to spend some time here in commenting on Whitley's provocative and important paper (Whitley 1991b). Recognising it as an important data source for this period, Whitley uses EIA settlement in Crete and elsewhere to reconstruct some aspects of social systems in the following ways. First, he draws a broad distinction between settlement types. On one side are 'unstable' settlements or settlement systems (a very widely-defined category, encompassing settlement or groups of settlement whose elements were occupied for any period 'from fifty years to three centuries' and then abandoned at any point within the EIA). In Crete, as I have already shown and will discuss in Part 4, a large number of settlement abandonments did take place by the early 10th century, and Whitley uses some of these examples. On the other side are placed 'stable' settlements and/or cemeteries, continuously in use through the EIA. Whitley then tries fairly directly to correlate the former type of settlement to societies with simple, shifting authority systems and the latter to those of more stable and complex type<sup>5</sup> (Whitley 1991b: 345, especially footnote 23). To support the second model, however, he immediately reverts to the burial record (partly because the settlement record at most continuing sites has still not been fully investigated or published). In the former case his main concern is only chronology of settlement and not its character or distribution; neither does he use mortuary data at all to support his hypothesis of instability or further characterise this suggested type of society. As I will show, the most obvious problem in accepting his argument for an equivalency between unstable settlement and achieved-rank social system in EIA Crete is the fact that the

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<sup>5</sup> He makes the point, however, that there is no 'standard' type of this class.

majority of settlements of his 'unstable' type were abandoned at approximately the same time (in PG) after occupation for approximately 200 years (see Chapter 4.1). This phenomenon does not fit well to the idea of fluctuating leadership status based on personal competition, and necessitating regular short-term movement between settlements (as communities moved with the leader who had won their allegiance). Functional similarities relating this class of settlements, particularly defensibility, are not brought forward by Whitley's analysis. The weaknesses I have just outlined undermine Whitley's arguments considerably, but he certainly seems right to highlight the significance of the continuation and expansion of settlements from the 10th century onwards for the development of complexity.

I have argued that the scale and the revolutionary character of the LM IIIC settlement change did not encourage continuity in sociopolitical frameworks. Most new settlements were not focused spatially around pre-existing major settlement locations, implying a fundamental change in prevailing notions of regional political identity. New inter-settlement relationships had to develop, including complex ones between some of the larger new sites and smaller ones in their regions, e.g. at Karfi. With new physical zones of subsistence activity and communication giving rise to new forms of interaction between communities, it seems unlikely that old centres could have retained many of their previous relationships with the population in their regions. People moved to the new settlements over a period of time, allowing them to recognise the implications of the move, and to actively engage in the construction of new social structures. All these factors make it difficult to envisage contemporary, but fundamentally different, *non-articulated* social systems emerging early in the EIA within any region of the island, as is suggested by Whitley's thesis. New settlement systems had to grow up together from the beginning - we do not see the constant, disjointed foundation of new settlements throughout the 12th and 11th centuries, which Whitley's model seems to suggest. The vast majority of all EIA settlements were already founded by the mid-12th century.

Haggis suggests that new collective identities corresponding to relatively small settlement groupings/localities may well have been some of the most important agents of social cohesion/authority at this time. His argument is based largely on the recognition of regional stability in settlement systems in the Crete:

'Regardless of the longevity of the clusters themselves, they do emphasize the nature of spatial patterns in the Dark Age: people inhabit and identify themselves with places, areas, and regions, not just bases, villages and central places. It is the complexity of this 'community of place' which should be a primary focus of Dark Age studies.' (Haggis 1999: 307).

I shall say more about the relationship between settlement and the construction of broader social identities over the course of the EIA in Part 4.

Aristotle's account of the emergence of the *polis* from disparate villages within a region has been frequently referred to in attempts to correlate settlement evidence with social change through the EIA (Aristotle, *Politics* I.II.1252b: 8; Coldstream 1984b, 1991; Haggis 1993: 162-5; Donlan and Thomas 1993). But the idea of a joining-together during the EIA of small 'pyramidal' social units at an existing larger settlement *already* representing a more complex social system, does not really work for the Cretan EIA settlement data. Instead, what seems crucial to the emergence of settlement nucleations and associated sociopolitical complexity from the PG period onwards is the development of the very sense of abstract regional focus Haggis refers to, in its turn based on and created by recent settlement history. Perhaps Aristotle's observation should be treated mainly as a rationalisation and ordering of the *status quo* of the Classical period, when *polis* existence and expansion was firmly structured around established large nucleated settlements.

*Big-man (achieved-rank) models of ranking systems and their applicability to EIA Crete*

A big-man model was suggested by Whitley for his pre-10th-century 'unstable' societies in Crete (Whitley 1991b: 348-9). Like most other scholars, though, Whitley does not expect the formalised big-man type to exactly represent social reality in the EIA. Instead, he uses the abstraction as a tool to point up contrast and diversity in contemporary social forms. His reason for favouring big-man models is partly his wish to associate them with unstable settlement, where 'people, not goods move' (an issue problematic as a result of poor definition of unstable settlement, as I have just discussed). He makes use of analogy, taking the Burmese Kachin example, where oscillation takes place between conical clan and egalitarian structures, to characterise a typically unstable social system (Leach 1964; Friedman 1975; Qviller 1981: 111-3). However, there is little evidence pointing to oscillating degrees of ranking in Cretan EIA society. In particular, as I shall show in this chapter, such evidence seems absent from the tomb record.

Whitley's analysis of EIA society is praiseworthy in that it does not attempt to define or explain social forms mainly in terms of their subsistence economic correlates. But in evaluating various social models we should look at some of their implicit assumptions about subsistence and see whether they fit the conclusions for Crete already drawn in this work. In classic big-man and chiefdom models, a leader's ability to retain power is based on his good access to indirectly-stored subsistence resources, through a network of extra-community alliances which need to be regularly demonstrated and consolidated (this can apply even where the leader's status is hereditary; Fried 1967: 13; Wason 1994: 42-3). A leader's position in his own community is maintained through the display and sharing of his wealth via feasting or



prestations within that community, encouraging tribute in turn. As Sahlins suggests, the big-man acts as a form of bank or shunting-station, although less institutionalised in this sense than a chief (Sahlins 1972: 211). Following from this, the Binford<sup>6</sup> analysis of big-man societies, reiterated by Whitley, is as fundamentally subsistence-determined, with a perceived 'need' for social storage to balance subsistence risk, but a limited ability to expand or improve subsistence procurement without alliances. Assumptions about subsistence are also implicit in the use of the Kachin analogy, if we accept Friedman's economic reading<sup>7</sup> of the oscillatory structure in this society (Friedman 1975). Here, lack of ability to consolidate permanent subsistence resources due to the prevalence of shifting cultivation practices (determined by environmental constraints) keeps social systems at a non-state level. Such constraints are not likely, as we have seen, to have applied in Crete: we thus have to look for other limiting factors and structures which kept Cretan societies in a pre-state condition for so long.

Whitley does not make clear, in his scenario of coexisting unstable and stable societies in the 12th to 10th centuries, whether he reconstructs completely separate schemes of social organisation, having inbuilt success or failure endings, or oscillation between one and other form of organisation, with the more complex, stable, form eventually gaining ground. As I suggested above, the first model is difficult to accept, given that LM IIIC defensible settlements which continue and expand in later periods are often located in close proximity to those abandoned by PG - could social systems at such communities consistently remain non-articulated? The maintenance of separate social systems and structures between two settlements like Lato and Kritsa, or Anavlochos and Neapoli Kastri, is difficult to believe in. Given the steady trajectory of increasing socioeconomic complexity seen in the Cretan EIA, which I shall discuss further below, an oscillation model is also problematic. Rather, I shall argue, Cretan communities in the 12th to 10th centuries already incorporated some authority/identity institutions different from those of typical big-man systems. In larger communities a slightly more complex social organisation is likely to have existed, but I see no clear archaeological evidence for fundamental differences in social systems within the island.

Rather than supporting a managerial/adaptive model of socioeconomic systems, the archaeological evidence indicates a strong role for active aggrandisement in Cretan society. Goods types can be recognised at this period whose acquisition contributed to, and whose value was perhaps promoted by, competition for status of the type already described. Alongside this kind of competition, however, it would not be surprising to find a lineage element in the

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<sup>6</sup> Binford 1983: 219-20.

<sup>7</sup> A reading which Whitley does not refute in his use of the analogy.



construction of social status in the Cretan EIA. Anthropological studies illustrate how 'achieved'-rank systems often incorporate the recognition of a hereditary basis for status, whether or not this is explicit (Allen 1984: 20-21; Wason 1994: 45-9). On analogy with these, EIA systems may have involved some kind of hereditary perpetuation of status, or simply the emphasis of kinship or fictive kinship links between parts of a cluster or wider group of settlements, as well as within individual communities (Haggis 1993). These kinds of links could create or strengthen various economic allegiances or obligations.<sup>8</sup>

There are various models for the character of supravening structures in big-man societies, as opposed to those in which rank is hereditary. Johnson and Earle note the cross-cultural occurrence of a conscious collective structure for big-man groups larger than 500 people, even where the group is dispersed among several villages (Johnson and Earle 1987: 20-21). We have already seen that many single settlements in LM IIIC had more than this number of people: leaders based here could also have had a remit for small groups in the same localities. However Donlan and Thomas, at least for the 12th to 10th centuries, suggest that large population groups (sometimes incorporating several big men) need not have had any collective structure, e.g. of a tribal kind. This seems to me less convincing (see Service 1971: 100; 131-2; Qviller 1981: 147-8; Johnson and Earle 1987: 20-21; Morris 1991: 43; Donlan and Thomas 1993: 66-67).

Clark and Blake describe an pattern of aggrandising activity which can apply to several types of non-state society:

'...in emergent chiefdoms or transegalitarian societies, we postulate the necessary presence of ambitious males (aggrandizers) competing for prestige within a regional setting. Aggrandizers do not strive to become chiefs; the end result of political competition cannot be foreseen by participants in the system. Aggrandizers simply strive to become more influential...Competition for "prestige" consists of rivalry for continual public recognition by supporters (with access to their resources). Prestige is maintained by establishing a coalition of loyal supporters, or 'faction'.....Effective competition at the community level requires aggrandizers to traffic outside their home communities and establish significant ties to individuals elsewhere,

<sup>8</sup> I have already commented on Small's model of sub-elite lineages with their own exploited territories retaining considerable social power through the LBA/EIA transition (Small 1998b). The notion of the essentially stable, and yet flexible lineage unit surviving the decline of larger power structures is a strong one. Even if a lineage element was important in EIA power bases, though, we still need to explore the other relations existing within and between groups in order to understand the forces of social change. Undoubtedly, new systems and scales of allegiance did emerge during the EIA.

preferably other aggrandizers who also seek outside contacts. The physical and social resources and knowledge thus gained allow an aggrandizer to compete more effectively within his own community.' (Clark and Blake 1996: 260).

I shall look below at archaeological evidence supporting the existence of this kind of socioeconomic interaction in 12th- to 10th-century Crete.

*The existence, character and social role of prestige goods in EIA Crete<sup>9</sup>*

The existence of prestige goods and the forms of their circulation and deposition can tell the archaeologist much about past social systems. While a chief-/big-man-type leader may not end up with a large wealth assemblage in his permanent possession, the passage of prestige items through his hands is in many examples essential to maintaining and legitimising his status (Fried 1967: 118; Wason 1994: 52-53). In the Aegean EIA, the circulation of various kinds of prestige goods through gift exchange and the social importance of control over their acquisition/deposition has already been discussed by, for example, Morris 1986, 1987, 1989; Whitley 1991a; Sherratt 1994; Crielaard 1998. Although EIA contexts of circulation and consumption were fundamentally different from those of the LBA, the symbolic role of some types of goods and materials is likely to have been perpetuated. Exoticity and antiquity, regular correlates of prestige items/materials in the LBA, were still recognised attributes of value in the EIA, as I shall discuss. But a new range of prestige items is archaeologically visible from the 12th century. Most important are the appearance of new value-added forms in various materials, and the growing uptake of iron, a high-value material to which access became strongly socially controlled in many areas of the 12th- to 10th-century Aegean. The prestige attributions of a new set of items/materials from the 12th century are rooted in social as much as economic change. The interplay of supply emanating from east Mediterranean region with demand, and later productive response, in the Aegean was heavily influenced by rapid changes in prestige item definition and relative value throughout the EIA, and with the strong conditioning effects upon social structures of their circulation and consumption.

Haselgrove suggests that 'Prestige goods are likely to be artefacts which require rare materials, considerable technical skills or a high labour investment, or are only available from outside the local system, e.g. foreign trade goods' (Haselgrove 1982: 81).

Such identifications are always relative to the society in which they are made. Thus the identification of prestige goods is not a simple or categorical one, and considerable variation in

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<sup>9</sup> All references not given in the text of this and the following sections can be found in Table 3.2-1 (Volume II).

meaning of the same goods in different regional contexts, as well as sometimes rapid changes in status over time, can occur - all seen in the present context, as I shall show (Sahlins 1982; Kopytoff 1986: 80-83; Pyrdyn 1998:97; Renfrew 1986: 162; Sherratt 1994: 62-3). Goods function as prestige items not only through their character but according to their sphere of consumption (e.g. Gell 1996: 112-3, Wason 1994: 95-98; 103-4 ). The funerary sphere is recognised as a particularly important one for the manipulation of prestige goods, and a type's regular appearance in tombs is often used to identify it as having prestige status. For the archaeologist, a certain circularity in then using the numbers of prestige goods in burials as indicators of personal ranking requires the use of other attributes in confidently assigning prestige status to artefact types. Exotic associations (whether the items are actually imported or locally imitated), antiquity, and rarity (arising from either of these qualities) are regularly cited as independent markers of prestige status (Haselgrove 1982; Wason 1994: 95, Helms 1988). Although prestige items also often have prime/intrinsic value (Renfrew 1986: 159) this may not always be the case. Added-value items like ceramics sometimes appear to have been treated as possessing a different 'level' of prestige quality. Deger-Jalkotzy notes that fine ceramics functioned as prestige items in the 12th-century Aegean, and in Crete it seems possible to identify a few ceramic forms as having added value at this time (Deger-Jalkotzy 1994: 19; see discussion below).

The perception of 'exoticity' is relative at this period. Cyprus and the Near East, the regions of origin for many of the raw materials and forms of EIA value items, certainly represented an exotic provenance for Aegean consumers (Sherratt 1994). On the other hand, Cypriot adaptation of many originally Aegean types, e.g. perhaps the bird vases (see below), ceramic drinking sets (Sherratt 1998) and imitations of amphoroid kraters in bronze (Catling 1993), brought a dimension of novelty and added-value to the range of prestige goods consumed in the Cypro-Levantine area. The same type of item could thus almost simultaneously hold 'exotic' characteristics for people in different regions. Based on the similar forms of deposition of similar types of prestige item in both areas, Crielaard asserts that 'comparable socioeconomic conditions' prevailed between Cyprus and Crete at this period (Crielaard 1988: 190-1). It seems, however, that availability and preference for a range of high-value Cypro-Levantine exotica were particularly strong in the 12th- to 10th-century Aegean (including Crete), legitimating the use of the term 'periphery' for the whole area (Sherratt and Sherratt 1993). The forms of status representation (e.g. in burial ritual) of those regularly involved in the consumption of 'international' value good types may have deliberately transcended some of the cultural traditions of their regions, but consideration of a broader

range of archaeological evidence suggests the social context of consumption did differ substantially between areas.

Crielaard's set of 12th- to 10th-century 'international' prestige goods are mostly defined on their presence (and associations with each other) in tomb contexts. They fall into the following categories: antiques (e.g. the jewellery of MBA date found with the Lefkandi heroon female burial and the boars'-tusk helmet from Knossos North Cemetery Tomb 201 (Popham 1994: 15; see Table 3.2-1 below); weapons and armour, including bronze shields and 'shield-bosses' (and, more rarely, iron weapons); bronze drinking equipment, including kraters and strainer jugs, and generally, all items made from material of high intrinsic value (because rare or having to be imported into the region) such as ivory and iron, or high convertible value, such as gold, bronze and iron (Crielaard 1998: 189). All of these categories of goods appear in tombs in Crete, and I will discuss them in detail below along with other prestige types in the island. Despite their cross-regional similarities, significant variations by region in the types and quantities of goods deposited clearly relate to differences in regional socioeconomic context. In 12th- to 11th-century Cyprus, for example, rich tomb assemblages include Canaanite and Egyptian alabaster jars, which are not found in the Aegean, and much higher concentrations of gold and iron and metal vessels than in any Aegean cemetery of this period<sup>10</sup>. There is also a much higher occurrence of sizeable bronze items in Cypriot settlements than is the case in the Aegean area, clearly pointing to a different social/economic meaning for this class of object in Cyprus (McFadden 1954; Benson 1973; Karageorghis 1983, 1990a; Catling 1996b: 522-4; Steel 1996).

Imitation of the forms of high intrinsic-value items in lower-value materials is often a good indicator of a type's prestige associations, and occurs in 12th- to 11th-century Crete. The clay tripods in tombs at Arkades, and the clay four-sided stand at Karfi (another one has recently been found in a shrine context at Monastiraki Chalasmeno) certainly imitate bronze types present in Crete at the same period (Pendlebury et al 1938: 34; Hoffman 1997: 118; Kanta and Karetsou 1998: 163; Tsipopoulou pers comm) - a real four-sided bronze stand comes from Knossos North Cemetery Tomb 201 (Catling 1996b: 517-8). Added value, derived from heirloom/antique status, for many large bronze items deposited in this period has been argued for by Catling (Catling 1964: 216-23; 1993, 1996b: 517-8). However, the number of bronze items he postulates to be heirlooms seems firmly founded in the belief that bronze was

<sup>10</sup> See in particular the cemeteries at Kouklia (Karageorghis 1983, 1990a; Crielaard 1998).

physically difficult to access in the Aegean at the time.<sup>11</sup> Viewed outside this assumption, a status for so many items as heirlooms may be difficult to defend (Catling claims the bronze krater in the heroon burial at Lefkandi, as well as the Knossos Tomb 201 stand and others in LM IIIC-PG Crete, all to be imported 12th-century antiques (Catling 1993, 1996b, 1999)). Along with other evidence, such as the 10th-century Lefkandi mould fragment and the possible mould fragments for a bronze tripod from LM IIIB/C Palaikastro (Popham et al 1980: 95-97; Hemingway 1996),<sup>12</sup> the fragments of a bronze tripod from Karfi, the find of a bronze amphoroid krater from a SM tomb at Veni, and the number of bronze tripods in Crete dating as early as the 10th century, may contradict, too, the view that these types are always imports, suggesting the dispersed 12th- to 10th-century manufacture of prestige bronzework items of internationally-recognised type (Pendlebury et al 1938: 117-8; Tegou in Stampolidis and Karetsou 1998: 84; Matthäus 1998: 127-128, 139; Hoffmann 1997: 117-20). As with other prestige goods, their main deposition context (tombs and sanctuaries) emphasises the extraordinary status these items possessed and conferred.

Turning to smaller items in bronze, some LM IIIC-SM jewellery forms, such as fibulas and straight bronze pins, have a variety of stylistic associations, including some with metalwork of the west Mediterranean, which perhaps added to their exoticity value (Catling 1996b; Palsson Hallager 1985; Hallager and Hallager 2000: 179). Such items, along with bronze weapons and tools, are not restricted to graves, and probably had less prestige value than the larger, special bronze types. Although provenance analyses for bronze from Chania show that raw material was obtained from a variety of sources at this time (Stos-Gale et al 2000), most small items were probably manufactured in Crete. By the 9th century, increasing quantities of large ornamental bronze items were being manufactured in the island, although a high number of imports is also seen (see below and Chapter 3.3). Vessels and stands, mostly deposited in tombs and cult places, were often closely influenced by or imitated Near Eastern

<sup>11</sup> A belief increasingly challenged - e.g. Morris 1989, 2000: 208-18; Sherratt 1994; Peltenburg and Pickles 1998 (the latter convincingly refuting the notion of a shortage of tin to make bronze at this period).

<sup>12</sup> See Catling *contra* Hemingway (Catling 1997). The context of the Palaikastro deposit - a pit cut into the top layers of soil, which could easily date to the period after the abandonment of the settlement and while Kastri was occupied, i.e. LM IIIC - suggests it may not represent such an early manufacture as Hemingway claims. If it could be certainly dated to LM IIIB, however, the similarity with the workshop/hoard find contexts of 12th century Cyprus would become even closer (cf. Catling 1964: 216-223) and would suggest that the role and production of the objects in both regions was more similar than we have hitherto supposed.



and Cypriot work (Hoffman 1997: 116-26; 149-51; 161-5) showing that large bronze items with exotic connections still held a prestige role.

Iron's strong prestige associations at this time must be linked to its status as a new technology, physically as well as socially difficult to access (Snodgrass 1971: 231-87; 1980b, 1982a, 1989). The relative proportions of iron and bronze found in and out of graves are particularly variable by region in the 12th to 10th centuries, and seem to be closely linked to each other (Waldbaum 1978; Morris 1989; Sherratt 1994). Both Crete and Cyprus have relatively high quantities of ornamental bronze in use alongside iron from the 12th century through the 10th. But while iron objects were usually small, obviously high-value items, deposited in tombs, in the 12th- to 11th-century Aegean (including Crete), in Cyprus iron was used to manufacture 'working' implements as early as the 11th century (although it continued to be regularly used in jewellery) again demonstrating variant contexts of supply, demand and consumption in different regions. The rise of iron as a full working material had taken place in most areas of the Aegean by the late 10th century, a fact which must have encouraged interest in alternative types of prestige items from this time (Snodgrass 1989: 23).

In Athens and other areas, deliberate social control over access to metals is thought to have worked, together with restricted access to burial, to consolidate elite position from the 11th century (Morris 1987; 1989; Sherratt 1994: 76-7). However, despite Morris's stress on seeing regional differences in metals deposition in a context of social control over access, rather than one of depersonalised 'circulation', the controls which emerged in Attica must have partly depended on a generally restricted physical availability of metals there. It is significant that a social control response did not occur in Crete, where good physical access to a range of Cypriot/Near Eastern exotica derived from the island's geographical position (Whitley 1991b: 360-1). Nonetheless, the appearance of iron in LM IIIC-SM Crete in small, mostly ornamental forms - knives/daggers, fibulae, rings and bracelets - in contexts which are almost exclusively tombs, indicates iron's role as a very high-value material here too. Many iron objects from 12th and 11th century Crete may have been imported: their forms strongly suggest inspiration, at any rate, by Cypriot/Levantine imports (Sherratt 1994; Catling 1996b: 528-90; Hoffman 1997: 141). Sherratt highlights the symbolism of the curved iron knife, one of the earliest iron types in Crete:

'a knife in the 2nd millennium in the eastern half of the Mediterranean is a gloriously ambivalent sort of artefact: at one extreme it is a purely practical, everyday cutting tool; at the other extreme it is a personal ornament with the potential for display and status-enhancement which personal ornaments may not entail. It is not in any important ideological sense a weapon... A knife of this sort would appeal, within the



conventional Late Bronze Age value terms associated with iron, to those looking for a status-enhancing novelty in a combination of artefact type and material which up to now had been the main preserve of relatively few.' (Sherratt 1994: 68).

For Sherratt, iron was actively 'marketed' as a value good:

'the very small numbers (and predominantly funerary contexts) of iron knives and other objects suggest that we may be dealing primarily with the fostering of an elite or aspiring-elite market for rare and exotic luxuries, rather than the active creation of a sub-elite or substitute-elite market as may have been the case in Cyprus and in parts at least of the Levant. (Sherratt 1994: 70-1).

She sees the main actors in developing the Aegean market as Cypriot/east Mediterranean traders. Her observations highlight, again, the different social context of consumption of the same types of value good in the two regions (*contra* Crielaard 1998).

Sherratt notes that paradoxically, although iron rapidly lost its status as a prestige good through its very spread, without this status its wide uptake might not have taken place. By the 10th century, the overall quantity of iron in Crete had greatly increased, as had the diversity of forms and the number of iron objects of 'working' type: it must have lost much of its status. However some PG and later iron objects (such as the iron obeloi in the Knossos and Gortyn tombs in the 10th and 9th centuries, and in the 9th-century temple at Kommos, have strong parallels with eastern types, and were probably originally inspired by imports. They indicate a continuing prestige value and eastern association for some iron objects in Crete (Coldstream 1979: 48-49; Shaw 1980: 231; Snodgrass 1996: 590-591; Hoffman 1997: 146).

Gold and ivory are clearly prestige items in 12th- to 10th-century Crete, as they had been in the LBA. Faience in LM IIIC-SM contexts<sup>13</sup> may be heirloom (LBA) in some cases and contemporary in others, but is certainly of high added value and its find contexts, mostly tombs, mark it out as of prestige status. Quantities increase in PG and later, and often have strong eastern stylistic connections (Webb 1996: 599-600). Pieces of rock crystal are found in several 12th- or 11th-century tombs in Crete, paralleled elsewhere in the Aegean and Cyprus, e.g. at Kouklia-Skales (Karageorghis 1983; 1990a): their rarity and aesthetically unusual/pleasing appearance make a prestige status likely.<sup>14</sup>

A couple of ceramic types, appearing almost exclusively in tomb contexts at this period in the Aegean, appear to have added value, probably related to their special

<sup>13</sup> Such as Knossos North Cemetery Tomb 200; see Table 3.2-1 below.

<sup>14</sup> See Table 3.2-1 for documented examples of rock crystal in Cretan tombs with material spanning the 12th-11th centuries.

function/contents and/or foreign stylistic connections (although their degree of value was probably less than that of most of the other types I have described). They are the bird askoi and lentoid flasks. Where found in Cretan contexts, these types are made in Crete and it is still unclear in what way they were exchanged. They are likely to have circulated differently from imported or otherwise more difficult-to-obtain types or materials. Bird askoi are probably derived from the round-bodied askoi appearing in the Aegean in LM/LH IIIB-C. Despite Desborough's rather tortuous explanations of the origin and spread of the askoi, involving two separate origins and a delayed spread,<sup>15</sup> the type is widespread in the 12th to 10th centuries over the Aegean and particularly concentrated in Cyprus, and may be added to the 'international' prestige good corpus. Lentoid flasks have a similar east Mediterranean background, being found in the coastal Levant and Cyprus in relative profusion in the late 13th through the 11th centuries (Amiran 1982: 166-7; 266-72). In the Aegean, they are found in 12th- and 11th-century tomb contexts at Aplomata on Naxos and at Perati (Zapheirópoulou 1960: 33-5; Plate 275b; Iakovidis 1969 (3): Plates 81; 93) and in 10th-century ones at Lefkandi (Popham 1994a: 14; Figure 2.2 e, f; Popham and Lemos 1996: Plates 42, 44).<sup>16</sup> Though mostly locally made, the fact that in the 12th century they are much more numerous in the Levant and Cyprus than in the Aegean, and that they are nearly always found in tomb contexts in the latter area, suggests a prestige value partly associated with foreign connections at this period. However, their presence in tomb contexts in Cyprus too (e. g. at Kouklia *Skales*: see Bikai 1983) suggests that a high value was also ascribed to this type in the wider east Mediterranean region too. That other fine pottery in 12th- and 11th-century Crete could have a prestige value arising from exotic associations is suggested by the unusually-decorated stirrup jar in the rich Tomb 200 at Knossos North Cemetery. This has strong late 12th- to 11th-century Cypriot parallels (Catling 1996a: 310).

Below, I look at tomb assemblages in 12th- to early 10th-century Crete with the aim of drawing some conclusions about ranking. The identification of prestige goods types was a necessary prelude to this discussion, but it is also necessary to consider the differential importance of particular types and their combination in denoting prestige, and this is attempted

<sup>15</sup> Desborough defined two types of the developed bird form: one with a bird's head and beak as the spout (Type I) and one without (Type II), noting the prevalence of both types on Cyprus and the Greek mainland from the 12th century onwards (Desborough 1972b; Lemos 1994). He observed the absence of Type I from contexts in Crete until PG, and later when it appeared in an elaborated form (although now see Kanta and Karetsou 1998: 164 for an LM IIIC/SM example from Arkades which has been reconstructed as a Type I).

<sup>16</sup> See Catling 1968: 114-5 for a comment on the appearance of this type in Crete.

where possible. The association of a number of these types in any one burial context seems likely to indicate a relatively high status. More specific interpretations of the status significance of some types of goods can be also put forward. Catling's identification of the assemblages of weapons in Knossos North Cemetery - Tombs 186 and the 200 group - with real 'warriors' is perhaps unnecessarily direct: the association of warrior accoutrements with high social status for males is seen to occur from LM II onwards at Knossos as well as through the EIA in Crete and elsewhere, and need not mean that the individuals with these grave goods had any permanent/specialised military status (Catling 1995; 1996c: 646; Driessen and Schoep 1998: 395; footnote 46; Whitley forthcoming). Deger-Jalkotzy links this type of burial assemblage directly to a contemporary background of conflict/insecurity, but also accepts that warrior symbolism in tomb material was a regular representation of high social status through these periods (Deger-Jalkotzy 1999). A tendency of some scholars has been to see the provenance or typology of prestige items in burials as directly indicating the ethnic origin of the people interred. Some of the pitfalls of this kind of extrapolation have been recently outlined for LBA Crete by Preston (Preston 1999). I will look further at questions of ethnicity in connection with the consumption and circulation of exotic objects in EIA Crete in Chapter 3.3. The approach I adopt here in discussing tomb assemblages is broadly that the deposition of prestige goods can tell us only a limited amount about social inequalities and their degree of institutionalisation, and needs to be considered along with other elements of the mortuary data, and with data outside the funerary sphere altogether.

#### *Inferences on social systems from the burial data for EIA Crete*

Intra-cemetery analyses of social differentiation demand sizeable contemporary assemblages. EIA Crete has an unpromising record for this type of analysis, for several reasons: a) few large excavated cemeteries, b) a wide range of contemporaneously-used rites and tomb types, which cannot be easily correlated or patterned, and c) the collective/long-term use of many tombs, making the dating of individual assemblages difficult. In addition, many tombs of this period have been either looted or inadequately excavated/published. All the uncertainties in ceramic chronology outlined in Chapter 1.2 also apply to cemetery material. However, there is certainly enough data to be worth examination on a cross-island level, as well as within cemeteries, where this is possible.

The use of EIA mortuary data to assess the representation of inequality, and from this to comment on social systems and structures, has good precedents in Morris and Whitley's work. Whitley contrasted social systems at Athens and Knossos through burial assemblages (Whitley 1986, 1991a, 1991b). Although Knossos was chosen because it provided the best

assemblage for analysis, his exclusive focus on this site restricted the view he was able to present of social systems and their development on the island as a whole. Other settlement sites and cemeteries do provide some evidence worth looking at in this respect. My analysis here, limited both by data and method, bears no comparison with more detailed variability studies, like those of Morris and Whitley (parallels to which might still be carried out with the full range of now-published Knossos North Cemetery material of PG and later date). More complex variability analyses than mine could also be carried out on some of the other, smaller, EIA cemetery assemblages in Crete, although with less significant results than for Knossos. Not all tombs of this period excavated in Crete are considered here, but all the main published examples are included. Prestige goods are identified as those belonging to the categories I have outlined above, and the significance of the quantities and types deposited per tomb or individual is assessed in conjunction with other aspects of mortuary data. Items whose prestige value is clearly intrinsic to their material, such as gold, ivory, iron, and large, special bronze types are taken more certainly to have functioned as status goods than other, more common types without intrinsic value (bird askoi and lentoid flasks) or small items in more widely-available value materials (e.g. bronze jewellery). The analysis indicates that the types and quantities of prestige items are more sensitive indicators of inequality than is the quantity of pottery in a tomb assemblage. The latter appears at this period to correlate most strongly with the numbers of individuals rather than their status.

Methodological points relevant to the extrapolation of social practice and structure from mortuary data are widely discussed (Saxe 1970; 1971; Binford 1972; Parker Pearson 1982; Hodder 1982b; Morris 1987: 110-18; Shanks and Tilley 1987: 42-5; Whitley 1991a: 23-34; Wason 1994: 87-102; Barrett 1996). I am very cautious in assuming here a direct relationship between burial practice and actual categories of status differentiation in past societies. The use of a variety of archaeological evidence in discussing the nature of ranking at this period helps to avoid such narrow assumptions, and I use other sources in the rest of this chapter to support my conclusions from the cemetery record. Rapid change over the course of the EIA in both physical access to prestige items and the rules governing their use in burial limits reliable extrapolation from tomb assemblages to social status. For example types/materials which are very chronologically sensitive in deposition, such as iron, cannot be used on their own to look at status differentials when dealing (as here) with burials spanning a period of up to two centuries. The same uncertainty also limits meaningful interregional comparisons of burial assemblages with regard to ranking.

The broadest cemetery sample outside Knossos is Karfi, with 21 excavated tombs, and about 5 more now visible on the surface (Nowicki 1998: 47; Nowicki 2000: 164). All are

rectangular tholoi and date to the site's period of occupation, from early LM IIIC-SM. The short occupation span and defensible character of the settlement make its cemetery a useful one to examine, in the light of Whitley's attempted correlation of this type of settlement with unstable social forms. The record outside Knossos is further boosted by data from cemeteries/tomb groups at Kavousi Vronda, Vrokastro, Phaistos Liliانا, Erganos, and Fatsi/Droggara, which provide various, limited types of information. Apart from these cemeteries and groups, we are dealing with scattered tombs, whose contents can give only an indication of the range of practices in use in mortuary representation. Table 3.2-1 (Volume II) summarises the data from the tombs discussed here, along with the necessary bibliographic references.

### *Across the island*

The variability in character and size of LM IIIC-SM tomb assemblages across the island clearly shows the existence of social differentiation. Tholoi are particularly common in east Crete, with cremations rather rare in the region: chamber tombs predominate at Knossos, where cremations are relatively common. But there are no definite regional patterns in burial forms (there are chamber tombs, for example, at Kritsa, Praisos and Vrokastro) and high variability in tomb type and rite exists also within single cemeteries, such as Knossos, at the same period. In other cemeteries, by contrast - e.g. Karfi and Kavousi Vronda - customs are very uniform. The high degree of overall variability seems to relate to a complex set of distinctions based on wealth, as well as age, sex, and some elements of regional tradition. Breaking down the data more precisely chronologically (according to the excavators' designations), variability is still pronounced enough, within either the 'LM IIIC' or the 'SM' period, to illustrate social differentiation, indicating that differences do not arise only from diachronic developments. In general, though, cremations are rare in the early part of the LM IIIC period, becoming more common towards PG.

The groupings of tombs I will now make by 'wealth' of prestige goods are of course artificial, and do not correspond to actual rank. The richest tombs are an order of magnitude above the rest; and most occur in the Knossos North Cemetery. They include Knossos North Cemetery Tombs 200/201, 186, 40 and 2, Mouliaana tombs A and B, and the Fotoula tomb at Praisos. These all combine, as features, relatively few burials with a large assemblage of prestige-type items (mostly in intrinsically-valuable materials). Most tombs of this level have a few iron objects, but some, e.g. Mouliaana A, are without iron altogether, and include 'traditional' LM III types of value item - bronze, ivory, gold and faience. Regarding dating, the Mouliaana and Fotoula tombs are clearly dated within the earlier 12th century, while the



Knossos ones belong at earliest at the end of the century. Vrokastro Tomb I is a problematic example: its rich assemblage is mostly PG and later, but its first use was probably in LM IIIC-SM, and its large size and quality of construction thus probably relate to this period. A burial at Knossos which seems to have special status, marked in partly similar ways to the other tombs discussed, is the re-used LM II chamber tomb at Ayios Ioannis, with two SM burials and a few pots, although value goods there are more limited than in the other examples cited. Another probably rich 12th- to 11th-century tholos tomb is at Veni, where a bronze amphoroid krater from a tholos was recently published without supporting details (Tegou in Karageorghis and Stampolidis 1998: 84).<sup>17</sup>

A number of tombs are characterised by an assemblage of several pots, a small amount of bronze, and one or more objects of iron, with sometimes some clay beads, a spindle-whorl, or a piece of rock crystal. These show us the practice of depositing recognised prestige goods in tombs which were not of the highest order. They must represent the existence of a group which had access to some of the prestige-good types in circulation, but was not able to amass/deposit a large quantity of them (and perhaps had no physical/social access at all to some (e.g. gold), although this is in doubt). These tombs are not set apart, and often involve a larger group (almost certainly a family group) than the one or two individuals found in the richest tombs. At Knossos, Gypsades tombs VIa and VII, Ayios Ioannis IV and Isopata tomb III, as well as North Cemetery Tombs 121 and 208, and perhaps the Kefala tholos at Knossos, fall into this group (though the latter is set apart by its unique form, and its antiquity may have lent it special meaning) Most of the tombs at Karfi are in this group, e.g. Ta Mnimata 4, 7, 9, 10, 16, 17 (although see the intra-cemetery analysis, below). All the tombs just referred to date wholly within LM IIIC-SM. Vronda tholoi 4, 7, and 8 are all used over the period LM IIIC/SM<sup>18</sup> through PG, but seem to be of the same 'medium' wealth level.

There are also examples of really poor tombs in LM IIIC-SM Crete. There are some apparently intact examples at Knossos North Cemetery which contain one or two pots only and no other grave goods (Tombs 112, 160, and probably 153). These are single burials, indicating that small numbers of individuals are not only characteristic of wealthy interments. Two of

<sup>17</sup> Part of an 'SM' cemetery (Tegou pers comm).

<sup>18</sup> See Table 3.2-1 for dating. The dating of the tomb material is still under debate, since many scholars find it difficult to believe that the tomb deposits begin in 'SM' (the opinion of the excavators) although the settlement did not produce any 'SM' material. The debate may be resolved by Mook's recent contribution (Mook forthcoming) which suggests a special symbolic role for ceramics with SM attributes in east Crete.



them are in shaft graves, a type distinct from other, richer tombs in the North Cemetery. At Erganos, two unlooted LM IIIC tombs have only a few pots as grave goods, despite the probable size of the groups (one has 6 individuals). The aptly-named LM IIIC 'Tombe delle Plebe' at Liliana (Phaistos), pits containing 1-5 interments each, have similarly meagre assemblages.

The very variable quantities and combinations of deposited value items I have just discussed show that wealth, while cross-relating with social status, was only one of several differentiating factors. Complex ranking systems and representations, not restricted to age, sex or wealth grades on their own, must have operated in 12th- and 11th-century society (Whitley 1986: 288-90; 1991a: 186-7). Lineage, too, seems likely to have been significant in LM IIIC-SM social systems. Collective, long-term use of tombs supports this positively (Saxe 1970: 19; 1971; Wason 1994: 90-2; see below) while the absence of clear ranking boundaries represented through value goods alone supports it in a negative sense.<sup>19</sup> While general lineage affinities may have been important in ranking, specific kin relationships must have had different perceived values. The occurrence in Crete at this time of child burials with inequalities between them, usually (though not always) in a family context, and the occurrence of rich female burials, both suggest the recognition and importance of inherited/family-linked status (Wason 1994: 98; Table 3.1-1).

The re-use of Bronze Age tombs through the EIA is an element of the archaeological record whose implications have been discussed at length (Coldstream 1976; Bérard 1982; Snodgrass 1982b; Whitley 1986: 275-7; 1988; Antonaccio 1995; Coldstream 1998b; Coldstream and Catling 1996: 718-9; Morris 2000: 238-54). It takes several forms in

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<sup>19</sup> Whitley suggests that at Knossos in the 12th-10th centuries, no tombs were used for more than a few generations (Whitley 1986: 275-7). His argument from this against the importance of lineage in 12th- to 10th-century Crete leaves aside important considerations such as the span of use of 12th-10th-century tombs elsewhere in Crete, whether it is right to put all 'SM' material at Knossos into an 80-year period, and the possibility of earlier material in some PG tombs, e.g. Fortetsa tomb XI, having been removed or destroyed by burial activity (see Catling 1996c: 640-1). Nevertheless, he is right to highlight the longer-term, larger-group tomb use starting from PG. Data from LM IIIA-B cemeteries indicates the common use of collective burials in relatively small (probably family) groups at this time (e.g. Forsdyke 1928; Tzedakis 1978, 1980; Hallager and McGeorge 1992) although this is not always the case, e.g. at Mirsini, see Kanta 1980: 163-173). Children are regularly included. However, variation from cemetery to cemetery in LM IIIA-B, as in LM IIIC-SM, means general rules are difficult to reconstruct. In LM IIIC-SM the number of burials per tomb is similar overall to LM IIIA-B levels, ranging between 2 and 6.

Crete, and should be studied in relation to settlement. There is the continued use of LM IIIA-B cemetery areas into LM IIIC, even after settlement relocation. This is usually seen where the new settlement is close to a LM IIIA-B settlement (e.g. at Praisos, Mirsini, Milatos, Kritsa (Whitley et al 1999: 246; Kanta 1980: 179-80; 163-173; 134-139; 125-8; Nowicki 2000: 103-4). At LM IIIC-SM settlements without nearby LM IIIA-B predecessors, new cemeteries are founded. Tombs in these cemeteries often have long EIA use (LM IIIC-SM through PG and sometimes G) and some (e.g. Vrokastro) appear to have sustained high levels of wealth through long periods of the EIA, a fact which may undermine Whitley's notion of achieved-rank social systems at this kind of settlement. The cemeteries at Vronda (see particularly Tombs 4 and 7), Vrokastro, and Fatsi/Droggara are all used from LM IIIC well into PG, and use continues into G in some cases at Vrokastro. At Knossos North Cemetery, tomb use spanning 2-300 years regularly occurs, particularly from PG onwards, and there is a significant number of tombs where such long-term use is initiated by the 11th century at latest (Whitley 1986: 275-7; see footnote 19 below). The use of LBA larnakes in some late 9th-century tombs in the North Cemetery seems to be another variation on the perceived importance of history/ancestry at this period (Coldstream and Catling 1996: 718-9). Use of tombs or of a cemetery area through the EIA sometimes corresponds to continued settlement occupation, but sometimes does not (as at Vronda, where the tombs continue through the period of the settlement's abandonment, with the remains of the settlement itself being used as a cemetery by LG). The various forms of re-use seem usefully viewed as part of the wider phenomenon of heritage consciousness of the Aegean EIA, connected to the emergence of collective identity structures (see Part 4). But the long-term continuous re-use, with few gaps, of so many tombs in EIA Crete does make a strong case for some form of individual lineage awareness, probably integrated with a developing local regional identity (Wason 1994: 90-92).

#### *Within cemeteries*

Intra-cemetery analyses can tell us a bit more, but the limited sample size restricts the amount of reliable inference. The range of variability in burials which I have described above does not suggest restriction of access to burial (of the kind which Morris argues to have operated as a control factor on competition in wealth good deposition in 11th-century Athens). Separate social groups within the community may have been represented in the spatial disposition of tombs/tomb groups, e.g. the apparently set-apart, rich tombs at Praisos Fotoula and

Moulana,<sup>20</sup> the child burials at Atsipades Pezoules. However, we still lack examples of this kind of separation of groups within a single area.

Within the group of very rich tombs at Knossos North Cemetery, it is possible to identify age/sex-related distinctions in the type of goods deposited - the jewellery's associations are with women and those of the weapons and military equipment with the males. The gender-based associations are clearly *enhanced* by the wealth of the assemblages - quantity/value of goods was obviously important in supporting/affirming these social roles. The weaponry and helmet plates in Tomb 201 probably relate to the male burial, as in Tomb 186. These two bronze-based assemblages, closely comparable in date and able to be attributed to two single individuals, may reflect very similar status. The man of Tomb 2, buried with more iron items in his weapon-rich assemblage, shows that while levels and forms of deposited wealth varied within this richest group, basic male elite status was characterised in the same general way. But in Tomb 40, which includes at least one male, the absence of weapons, but the richness of the assemblage in iron, bronze and gold jewellery shows other differentiating factors in force than a simple rich male = warrior equivalency. The women in Tombs 200 and 201 (both rich assemblages) have different types and amounts of associated jewellery, with the assemblage in Tomb 200 being much the richer.

Tomb type may also tell us something about status differences between the buried individuals in this cemetery. I have mentioned the poor assemblages from the shaft graves 153 and 160. The richest assemblages, like those of Tombs 2, 186 and 200-201 are often associated with the 'pit-cave' type of grave. There are not enough examples to show this as a clear distinction, however. Burial rite may also be wealth/status-linked here in the 12th and 11th centuries: cremation is applied to the very richest individuals but is not universal in the other burials of this date (see Crielaard 1998: 188-9). Some of the poorest tombs are inhumations (18, 16, 98), but the poor tomb 112 has one cremation and one inhumation. Other socially-distinguishing uses of cremation may also apply at this period, however (at Liliana, the only cremation is of a child, and there is also a child cremation at Erganos).

Cemeteries outwith Knossos also reveal some elements of internal differentiation. At Karfi, the size and relative wealth of the assemblage in Ta Mnimata Tomb 11 mark it out (though not dramatically) from many of the others in the cemetery. It is sizeable, with only two burials and a relatively large amount of metal, including several items of iron and special ceramic types. Ta Mnimata Tomb 8 parallels Tomb 11 in several respects. The Liliana 'Tombe delle Plebe' are differentiated by type and number of burials as well as by quantities of grave

<sup>20</sup> Although see Xanthoudides 1904: 50-1 for other rich tombs in the Moulana area.

goods, with the individual pit burials F, G and H having no grave goods. The richest tomb (with the most numerous pots, alongside two bronze items) is D, with 4 burials. Thus even within a generally poor cemetery, some differentiation is apparent.

The rest of the available evidence is not adequate for meaningful analysis of intra-cemetery differentiation. Of the tombs spanning the LM IIIC-PG periods only at Vrokastro, Tomb V is differentiated, but only slightly, from Tomb VI in terms of the number of pots it contains. Tomb VII is rather poorer than both the others, though all three tombs contain approximately the same number of individuals: Tomb V's were cremations.

The evidence from the only two really analysable cemeteries suggests that a fairly developed form of ranking, related to wealth as well as to other attributes, including age and sex, did exist at 12th- to 11th-century Knossos, and that there was some, perhaps less complex, ranking at Karfi. This does not show, however, that society at Karfi was more egalitarian, since there was undoubtedly a bigger population at Knossos. Appropriation of a large proportion of total cemetery wealth to a few individuals is not seen at Karfi, though this is what we might expect in a 'simple' achieved-rank society.

The full range in wealth distribution apparent at Knossos, in conjunction with the extreme richness of a number of tombs there, may indicate a larger, more formalised and better-resourced elite there than existed at Karfi. Given its great variability range, it is unlikely that the North Cemetery as a whole represents an elite group with exclusive access to burial. At Karfi, too, though range of variability and form in assemblage and funerary rite is fairly small, the number of tombs, given the size of the settlement, argues against a single group having exclusive access to burial. In Crete as a whole, while it appears that some cemeteries have much less variability within them than is seen at Knossos, and that particular social groups may sometimes even be spatially separated in burial, there is little evidence for restriction of access to burial or to specific types of grave good to one group alone. At Knossos, Whitley characterises this lack of boundaries as a representing a kind of free-for-all where 'eclecticism is the only rule' (Whitley 1991a: 186-88; 1991b: 355-6). While I think it likely that some social rules did govern the use of such a complex range of mortuary forms in the island, and that we are simply as yet unable to identify these rules, I agree with Whitley that the sphere of prestige good acquisition and deposition in graves was not one in which social control was possible/desirable to exert. Whitley's view that this relates to Crete's geographical position is convincing. Following from these conclusions, it is more likely that alternative forms of institution/control existed early on within the Cretan social system. In true big-man societies we would expect to see very simple wealth differentiation between social groups, with the entire

concentration of wealth at the top (Wason 1994: 47) - the absence of this pattern argues for a different basis of social power.

#### *Cemetery data for the PG and later periods*

Whitley's work on Knossos, and Tsipopoulou's brief observations on EIA tombs in east Crete (Tsipopoulou 1987) show that although cremation becomes much more dominant from PG, variety in tomb type and assemblage character continue to be pronounced. This suggests that while the mortuary arena continued to be used to reflect/construct social identities, access to prestige goods or to burial itself was still not rigidly socially controlled. Only by the 8th century does Whitley see a consciously restricted use of value-added items, in the favouring of a particular workshop for burial amphorae, a kind of stylistic rationing. This seems to indicate the conscious strengthening of forms of elite institutionalisation separate from wealth accumulation (Whitley 1991a: 186-7). The number of individuals interred per collective tomb generally increases from PG at Knossos (Whitley 1986: 275-7; Coldstream and Catling 1996). The same pattern of more burials/larger assemblages appears from PG onwards in the collective tombs at Vrokastro and Fatsi, and there are large collective tombs at Gortyn (9th-century) and Kavousi Plai tou Kastrou, Aloni and Skouriasmenos, dating in the period from PG-O (Coldstream 1979: 48-49; Evans 1892, 1896; Gesell et al 1983: 391-3; 410-3). There are increased overall quantities of metal in Cretan tombs of all levels of wealth and in all parts of the island. The role of many types of prestige good was changing in the climate of generally increased supply by the late 10th century, further reducing the potential for reliance on this mode of status distinction in the Aegean (Sherratt and Sherratt 1993: 364-66). The apparent lack of attempts in Crete at the time of this upsurge in supply to control social mobility by restricting access to prestige items suggests a smooth accommodation of the changed situation (or a lack of power to exert this kind of control), contrasting with the need for considerable social restructuring which Morris and Whitley suggest for Athens from c. 900 BC.

#### *Intra-settlement and other non-cemetery evidence relating to social differentiation*

In Crete it is not the case that 'most evidence is funerary' (Morris 1998: 100 for EIA Greece in general), and other aspects of the archaeological record are of value in examining social systems at this time. I have already looked at some of the social implications of the large-scale settlement pattern change in LM IIIC. At the level of the single settlement, too, features relating to social differentiation may be identified..

Considerable attention has been paid to identifying special-function buildings, primarily on the basis of size. The large building A/B at Kavousi Vronda, with two hearth



areas and some indications of specialised activity, has regularly been cited as having had some special social function (Whitley 1991b: 349; Day and Glowacki 1993; Haggis 1993: 151; Mazarakis-Ainian 1997: 210; Day and Snyder forthcoming). In support of his theory of the close attachment of EIA cult practice to the person of community leaders, Mazarakis-Ainian has identified several other large EIA buildings at Cretan settlements as 'ruler's dwellings', sometimes on minimal evidence. He cites a large Geometric structure at Kavousi Kastro (Building 27) as a 'ruler's dwelling': the characteristics of this building in the LM IIIC-SM period are not clear (Mazarakis-Ainian 1997: 212-3). The largest structure at Vrokastro (Building 16-17) with a substantial amount of cult-related material, is also pointed to as a possible 'ruler's dwelling' by PG-G, the period to which the visible remains date (Mazarakis-Ainian 1997: 213-4).<sup>21</sup> Again its character in the LM IIIC-SM phase of the settlement may have been different. The prominent position (on the highest point of the site) of the large buildings at Vrokastro and Kavousi Vronda is suggested to have related to their specialised function. At Smari, the large complex A-B (dating SM-LG) is suggested to have had a special role (Mazarakis-Ainian 1997: 219). This attribution gains support from the unusual character of the complex, which stands on its own with a perimeter/fortification wall and bears little resemblance to other contemporary settlements. (Hatzi-Vallianou and Parchapidis 1999). At Prinias, the SM/EPG building which was the predecessor of Prinias Temple B is suggested to have had 'important communal functions' based on its size, and on the contemporary and later use of its site for cult activity (Mazarakis-Ainian 1997: 224-6; Pernier 1914, 1934). A large, isolated PG-G building at Ayios Konstantinos near Praisos has been called a 'palace' (Mazarakis-Ainian 1997: 207-8). However, the dating of this structure is questionable on the basis of the most recent survey, and it is not an integrated part of any settlement (see Whitley et al 1999: 235, where it is dated LM IIIA-B). It seems most likely to fit to a pattern of outlying farmsteads in this and other regions, observable in both the LM III and PG-A periods (Hayden 1997).

The problem in using sizeable buildings to reconstruct social inequality is pointed out by Nowicki for Karfi, where Pendlebury's original nomenclature for the buildings is suggestive of a social system completely unsubstantiated archaeologically. Nowicki points out that the 'Great House' (Rooms 8, 9, and 12-14) is actually uncertain in its boundaries and was added to over time, so that during at least part of the life of the settlement it was not the biggest structure, with the 'Priest's House' (59-61, 80) and Megaron 138-140 very similar to it in size

<sup>21</sup> Morris notes a relatively high concentration of metal in Building 16-17 at Vrokastro, although the finds are not clearly associated with any one phase of the building's use (Morris 1986: 10-11).



(Nowicki 1987: 238; 2000: 162-3). Mazarakis-Ainian also remarks on the large size of the megarons at Karfi but seems to treat them as a single large building rather than four adjacent structures (Mazarakis-Ainian 1997: 219-20; referring to structures 135-143). The co-existence of several large buildings at Karfi might conceivably suggest a system of coexistent leaders/lineages, rather than a system based on individual competitive leadership. This is in line with what has already been suggested for larger EIA communities (Morris 1991: 43; 1989: 513). No clear functional differentiation was confirmed in the initial excavations of the large buildings at Karfi. However, re-study of ceramics from the Great House and Megaron 138-140, plus analyses of both artefact and bone material at Kavousi Vronta Building A-B, have highlighted some distinguishing characteristics of the deposits (Day and Snyder forthcoming). All have relatively high concentrations of kylikes and other fine ceramic vessels. At Vronta A/B, a large ceramic window frame with painted decoration, a unique object on the site and from the period, additionally suggests a special role for the building. Day and Snyder draw attention to concentrations of animal bones of specific types - cattle horns and boars' tusks at the Great House and an arrangement of skulls with the lower part missing at Vronta Building A/B - in suggesting that specific cult rituals appertained to these buildings. A concentration of horn was also found in the Priest's House at Karfi, suggesting similar activity there.<sup>22</sup> Apart from this, the Great House at Karfi seems to have had its own? adjacent shrine area (Room 16/17), but similar concentrations of cult material were also found in or near other buildings on the site. Day remarks on the apparently high quality of construction in the Great House, setting it apart from other buildings in the settlement (Day pers comm). All the structures are in such poor condition and planned in so little detail that it is difficult to say much on this subject. Morris remarks on the high concentration of bronze in the building as a differentiating factor (Morris 1986: 10-11).

The length of use of the buildings just discussed (spanning the life of their settlements) suggests the existence of permanent social institutions not entirely fitting the model of a big-man social system (Wason 1994: 133-45). The Great House at Karfi was expanded over time, though, possibly suggesting changes in the social function of buildings within the settlement. Continued use of such 'special' buildings may have helped to consolidate the authority of those connected with them in a recursive way (exemplified in Lane's study of the Dogon (Lane

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<sup>22</sup> The presence at Thronos Kefala/Sybrita of numerous pits (many unassociated with built architecture or stratified occupation deposits) containing mixed coarse and fine pottery and a high density of animal bone, may have a similar significance, and indicate that the activity was more important than the structure in which it took place (Prokopiou 1991; 1997; d'Agata forthcoming a).

1987). Expansion in the size of other dwellings (without evidence of special function) over the course of the EIA may simply relate to the altering sizes of individual family groups, but may also have broader social implications. The growth of some buildings at Kavousi Kastro and Vronta during the EIA has been associated with enlargement of the basic kin-based unit, representing a fundamental change in social structure (Jameson 1990: 108; Haggis 1993: 151; forthcoming; Glowacki forthcoming).

The premise of Mazarakis-Ainian's work is that change in social systems over the course of the EIA was directly manifested in architecture, with the transformation of personalised 'ruler's dwellings' into public cult places by Geometric seen as fundamentally connected to the rise of collective institutions at this period. In Crete, however, it appears that LM IIIB-C settlements already incorporated separate, specialised cult locations. This (together with the growing importance of shared extra-settlement shrines from this period) suggests an early date for the institutionalisation of cult beyond the personal, a process which can be seen to have continued throughout the EIA (Watrous 1996: 101-111; Mazarakis-Ainian 1997: 377-8; 393-394). There is little to show that the examples of differentiated structures I have discussed above were the focus of cult practice, though it may well be that high-status individuals using these structures used religion as a form of legitimation or had special religious responsibilities. In some cases, as at the Karfi temple and Vronta shrine, a completely separate public area dedicated to cult practice exists within the settlement. The social implications of this are ambiguous. On one hand, the lack of identification of cult practice with a single leader might be expected for achieved-rank societies, where leadership status was transient. On the other, the institutionalisation of cult seems so far developed in 12th- to 10th-century Crete that it seems to indicate the existence of more complex authority systems. I prefer the latter explanation.

Nowicki has suggested that the construction of fortification walls at sites like Kastrokefala Almyrou, Zakros Kato Kastello and Kritsa Kastello was only possible in the context of large communities with a complex organisational structure (Nowicki 2000: 226-7; see also Mazarakis-Ainian 1997: 384, who stresses the significance of 8th-century Aegean fortifications in this regard). However, in view of the fact that the materials and skills needed were easily accessible and non-specialised, and that the labour involved would not demand a huge amount of time, it seems wise not to assume that highly complex/specialised organisation had to be involved in the types of construction we see in LM IIIC (although see Wason 1994: 145-9). Fortified sites in LM IIIC-SM Crete are usually of fairly large size: the more complex systems we might expect in a larger group would be best able to co-ordinate and sponsor the work necessary to use these locations securely.

*The social context of the production and exchange of value goods - changes between the 12th and the 8th centuries*

Bohannon's study of the Tiv makes the important point that although many prestige goods are not supposed to be exchanged downwards and are often conspicuously consumed or permanently altered in form to prevent this taking place, obligations to kin can and do override the prohibition (Bohannon 1968). Such obligations may exist at a clan level, and thus cover fairly large regions of circulation. The range of variability in deposition patterns of prestige goods which we have already seen throughout the EIA in Crete suggests the accessibility of such goods over a large social range, best explained by reference to convertibility (*contra* Morris 1986). Only very high-value materials like gold, and perhaps ivory, may have been truly socially restricted in their circulation at this time.

The production of value goods in Crete already had a somewhat decentralised pattern by LM IIIA:2-IIIB. The previous concentration at Knossos of specialised manufacture of ivory items, seals, stone vases and some sword types had apparently given way to a much more spatially diverse production base, suggesting a decline in centralised investment in these types of production (Doxey 1987: 310-14; Banou and Rethemiotakis 1997; Haskell 1997; Poursat 1997; Hallager and Hallager, eds., 1997). Regional ceramic workshops/styles are also stronger in this period, with a relative decline in Knossian exports to other regions and in the influence of Knossian ceramic styles (Tzedakis 1969; Kanta 1980: 289; Popham 1994b: 90-91; Banou and Rethemiotakis 1997). It is probable that specialist craft workers were now more concentrated at the regional centres, and that they were partly supported through exchange links within and between regions, at a variety of social levels.

From LM IIIC, with the apparent absence of any complex economic infrastructure, the framework of production is likely to have been even smaller in scale and less regionally centralised. The political and economic relationships between communities, as well as the types of items in demand, underwent such a degree of change that it is impossible to imagine that many elements of production systems were perpetuated, although the same skilled individuals must have continued to work, in response to new, changing kinds of demand. At LM IIIC Chania, for example, pottery manufacture seems to have diversified from the dominant technique of the LM IIIA-B regional 'workshop' (Hallager and Hallager 2000: 171-2, 203-4). Through provenance analyses of fine pottery at different LM IIIC-SM sites it might be possible to throw some light on regular exchange links in the period, but as yet, this has not been widely undertaken. Coarse pottery from LM IIIC-SM sites seems similar in fabric composition over large regions, although various clay sources are used (Haggis and Mook 1993; Nowicki

2000:267-9; Haggis forthcoming; Moody pers comm). These similarities suggest regular contact between producers in different communities. Long-distance exchange of fine pottery within the island certainly took place, too, as evidenced by 'Knossian' and 'Palaikastrian' pots<sup>23</sup> at Chania (Hallager and Hallager 2000: 163-4; 173; 194). The existence of high-quality painted pottery throughout the period indicates specialised production, and the shapes and decorative forms used indicate that potters regularly came into contact with ceramics from the rest of the Aegean (Rethemiotakis 1997a, b; Warren 1982-3; Borgna 1994; 1997). However, local production traditions are very noticeable too, in the SM style of central Crete (Chapter 1.2) and the strongly Mycenaean tradition of the Mesara pottery during LM IIIC (Borgna 1994, 1997; d'Agata 1997). Skilled potters, regularly in touch with new fashions and forms, were responsible for productions like the Ayia Triada animal figurines, the 'chest-shaped vessel' from Kastelli Pediada and the Moulana krater (Kanta 1980: 175; Rethemiotakis 1997a; d'Agata 1997). As we have seen, other, less technically-demanding, ceramic types, whose value derived from exotic connections in style or contents, were regularly produced within the island - e.g. the clay tripods from Arkades and the bird askoi and lentoid flasks from 12th- and 11th-century tombs. All these forms point to potters either working 'to order' or speculatively investing time in products which could be consumed only in special contexts.

In view of the number of bronze items found in 12th- and 11th-century Crete (see in this respect particularly the Karfi material), production certainly took place at a number of locations. The raw material came from a number of sources, probably including remelting (see Stos-Gale et al 2000, and the following chapter). The existence of clay imitations of special bronze types, like the tripod and four-sided stands, shows that the producers of the imitations had seen metal examples at some time, but that access either to the items themselves, to adequate quantities of metal, or to the requisite technical skill, was physically restricted. The probably LM IIIB-C bronze mould fragments at Palaikastro (whether or not they are for a stand) indicate the early existence of local high-value bronze production, and the fragments of a bronze rod tripod from Karfi need not have been made far from the site, given the amount of metal present there. No ingots or scrap bronze hoards have yet been found in the island from this period, but a recent find of a broken bronze sickle and a piece of solid unshaped bronze, probably a kind of ingot, at Monastiraki Katalimata (a small site which may have been only occupied sporadically) shows it was worth keeping rough metal at hand with a view to reworking or exchange for reworking within the same small locality.<sup>24</sup>

<sup>23</sup> I.e. ceramics paralleled in the broader regions of these sites.

<sup>24</sup> The finds are referred to here by permission of K. Nowicki.

Iron, at least in the 12th and 11th centuries, was another matter, its rarity seeming to indicate that knowledge of the technology was limited to a fairly small number of producers. These probably derived their stylistic inspiration initially from imported examples,<sup>25</sup> and their skills in some cases from contact with people originating from the east Mediterranean (see discussion above and Hoffman 1997; Sherratt 1994; Snodgrass 1980b; Chapter 3.3 below).. Ethnographic examples exist of unstratified societies where transient workers or those external to a community are commissioned to produce 'one-off' objects of high status-value, by leaders with limited power to accumulate wealth, and thus to support permanent specialists (Davenport 1986: 95). This system allows a few specialised craftsmen to serve many communities and also helps to preserve the rarity/mystique value of the objects.

While this model might apply, at least in part, to 12th- to 10th-century iron production in Crete, the context and scale of production of both bronze and iron objects had changed substantially by the 9th century. The amount of bronze deposited had become much larger, as a result both of increased imports and developing local manufacture of large items of prestige bronzework. The changes in production must have been directly integrated, via new demand and consumption structures, with change in social institutions. We see a shift in consumption context in the increasing volume of large bronze value items deposited at sanctuaries from the 10th century onwards (see next chapter). The technical quality of bronze, ivory and gold items reflect the existence of very highly-specialised, skilled production from at least the 9th century (Hoffman 1997: 248-9). The quantity of iron in circulation also grew in the 10th century: the days of its function as a prestige good were not over, but it had certainly become socially devalued (Morris 1989: 511-2). Knowledge of iron technology must have become much more widespread.

Specialised craft good production was clearly becoming more complex, involving a larger number of people at various levels of skill. The growth both in imports and in local production of value goods reflects increased elite investment in production and procurement by the late 10th/early 9th century. A general rise in economic and social complexity must have been stimulated by the increased volume of value good consumption. The complex structures were, in turn, responsible for growing demand for these goods. Steady growth facilitated and required the expansion of production in the subsistence sphere as well, eventually favouring the appropriation of political and economic power at larger, more formal scales. As I shall show in

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<sup>25</sup> As I have noted, various new types in iron, with probable Cypriot/east Mediterranean origins, continued to appear in the island after the 10th century, and were reproduced/modified by local producers.



Part 4, settlement nucleation and expansion occurring at the same period, and the emergence of new political and land ownership systems connected with this, must have been closely related to all the other developments. The complex set of relationships I see as producing socioeconomic change from the 10th century is represented in **Figure 3.2-1**.

### *Conclusions*

During the 12th and 11th centuries, limits to the importance of value goods in consolidating status, and limited ability to get 'off the ground' in subsistence surplus production (due to historical/political constraints on settlement), must have discouraged large-scale investment in craft production. Together, a lack of centralised political/economic systems (to organise materials procurement, finance, and distribution), physical dispersal of craft specialists within the island, and geographical proximity to unregulated supply sources of finished value items/raw materials must have encouraged great fluctuation in the value of these products. This had potentially destabilising effects in a system where acquisition of value goods was important (though never definitive) in social ranking. All these factors made the margin of power achievable by any group or individual essentially weak.

Thanks to these factors, particularly geography, Crete faced challenging volatility in value good consumption earlier and to a greater extent than other Aegean regions. Rather than responses involving increased social control over access to goods, I think the challenge was buffered by the early development of alternative forms of status/authority and identity reference. This theory best explains why in Crete the rise in physical availability of value goods which affected the whole Aegean 'did not so much revolutionize DA ritual forms (as in central Greece) as amplify them (as in Western Greece)' (Morris 1997: 42). Value goods could continue to play a social role because this role was limited.

The early social institutions in Crete probably included the partial vesting of status/authority in lineage, as well as reference to wider collective identity structures. Whitley notes the inapplicability of either his big-man or 'Nuristan' model of symbolic rationing to EIA Knossos, arguing instead for 'a notion of community that did not depend on the transient authority of a big-man.' (Whitley 1991a: 186-188). I hope to have shown that more stable social forms than those typical of a true big-man system could have prevailed as easily at the other settlements of this period as at Knossos. Evidence pointing strongly to a role for kinship in social relations includes the use of collective interment (already established in the LM IIIA-B period), with some indications of the perpetuation of wealth levels in the same burial group over time, and the continuation of cemeteries between the LM IIIA-B and LM IIIC periods, and from LM IIIC through the PG-G/O periods (usually connected to settlement continuity). The



strength of the clan as a social unit in A-C Crete, indicated by ancient texts, also argues for the importance of lineage bonds in the EIA (see Part 4). Evidence for other partially institutionalised social forms in the 12th and 11th centuries includes the apparent separation of public from personal cult activity, and the long-term perpetuation (in PG-A) of regional settlement systems established in LM IIIC. The latter suggests the existence of strong collective identity structures, perhaps founded on, or expressed in terms of, expanded kinship links (discussed further in Part 4). In the absence of private, formalised landholding in the 12th and 11th centuries, such identity structures would have a crucial stabilising role in both subsistence and exchange interactions.

There are plenty of cross-cultural examples of limitations being imposed on state emergence by strong lineage-based structures (Fried 1967: 173; Qviller 1981: 110-11; 146-7; Allen 1984). Such limitations may apply to EIA Crete and to the form of the *polis* which emerged there (Morris 1998: 100). However, the state form which emerged at Athens was even further from the 'classic' state model,<sup>26</sup> despite less clearly lineage-based forms of EIA social control there. It seems in fact to be the absence of resilient enough social institutions which lies behind the more disruptive nature, and finally more radical citizen-state outcome, of social change in Athens (Morris 1987; 1998; Part 4 below). Conversely, early social control forms in Crete may have been largely responsible for maintenance of a fairly 'even keel' during the whole period of the rise of the state.

The three-stage evolutionary model of Aegean EIA development suggested by Donlan and Thomas is very difficult to apply to Crete in the light of the above discussion (Donlan and Thomas 1993). A jump from a true big-man to a lineage-based system at any period is difficult to reconstruct there. While Whitley skirts the problem by arguing for diversely-structured societies within the island, my review of a range of evidence types suggests that no 12th- or 11th-century Cretan society need have been characterised by a purely achieved-rank system. However, lineage-based models like those of Small<sup>27</sup> promote a notion of LBA-EIA social continuity clearly not supportable for Crete. Fundamental structural change, arising from new types and scales of inter-community relationships, and new forms of socioeconomic interaction, must have occurred in the island from c. 1200 BC.

<sup>26</sup> Gellner's 'agro-literate' state, as cited by Morris 1998, referring to Gellner 1983.

<sup>27</sup> Small exempts Crete from his discussion (Small 1998b: 284).

### Chapter 3.3

#### **The wider context and the longer term: the relationship of external contacts and internal socioeconomic developments in Crete in the 12th to 8th centuries BC**

##### *The Iron Age world-system and the role of Crete*

I have already discussed the role of prestige items, which often had a strong element of exoticity, in Cretan EIA society. The circulation of this type of good related at least in part to new forms of non-elite exchange developing in the east Mediterranean region.

‘During this period of fundamental social transformation, the command economies of the second millennium gave way to less centralized forms of economic organisation which were to characterise a whole period of accelerating growth that lasted for the whole of the first millennium BC....Fundamental to this new pattern was the dissociation of trading activity in high value materials from the control of the state...New forms of political power gradually emerged in response to the erosion of direct control of mercantile activity.’ (Sherratt and Sherratt 1993: 362).

This persuasive narrative of economic development from the LBA to the EIA is couched in terms of a world-system model (see also Liverani 1987; Sherratt and Sherratt 1991; Sherratt 1994; Sherratt 1998). In contrast to the tight control of routes and materials by large states in both the Levant and the Aegean which prevailed in the LBA - a multiple-core system - opportunities for alternative forms of articulation between regions were now available. The coastal Levant and Cyprus were (primary or secondary) source areas of many established high-value commodities, and already had the basis of a socially diversified exchange infrastructure in the 13th century (Zaccagnini 1977; Liverani 1987, 1990; Heltzer 1988; Knapp 1990; Sherratt 1998). The post-1200 BC Aegean is seen as acting as a consuming periphery to this area. Also freed-up from tight LBA social controls on goods circulation, it was able to act as a market as well as a trans-shipment zone or intermediary for goods crossing the Mediterranean (Deger-Jalkotzy 1998: 115, Crielaard 1988: 187).

This discussion in this chapter is set against this background. I will refer to many of the same concepts, and revisit some of the same evidence, discussed in Chapter 3.2, but my focus now is on the *process of interaction itself* between Crete and the outside world, and what transformations this underwent between the end of the LBA and the 8th century. I will pay attention in particular to the implications of the settlement shift and of changed social relations within Crete for the character of this interaction. I will address the issue of immigration into the island during the EIA in the light of what I have previously observed about contemporary social systems and the role of exotic prestige goods in these. Developments in value good

procurement, production and circulation in the island from the 10th century, which I already started to discuss in the last chapter, are returned to in connection with these issues.

It is difficult to see Crete as isolated from external contacts at any point in the EIA (Coldstream and Catling 1996: 721; Hoffman 1997: 7, 255-6). Morris suggests a general gap in imports from c. 1050 to 950 BC, but this may be more apparent than real (Morris 1997: 42; see Hoffman 1997: 7; 147; 255-6 *contra* this view). SM tombs in the North Cemetery may have at least some of their exotic items imported as late as 1050 BC. The growing volume of iron in the island between the 12th and 10th centuries suggests that regular contact with the east Mediterranean continued throughout the whole period (Sherratt 1994). The volume of imported eastern bronzework and the developed character of local imitative production seen by the late 10th/early 9th century also support the view of maintained contacts (Hoffman 1997: 256; Matthäus 1998: 127). The development of the SM and then PG pottery styles show regular contact with the central Greek area through the 11th and 10th centuries. Crete was well-placed with regard to a southern shipping route across the Mediterranean from the coastal Levant and to an intra-Aegean route on the north, both clearly operational during the EIA (Shaw 1989: 182; Sherratt and Sherratt 1993).

*Background: long-distance contacts of Crete in the LBA*

The 13th-century development of more 'merchant-led' maritime trade outwith full state control, emanating from Cyprus and the coastal Levant and drawing in much of the Aegean, must have affected Crete, which was on a main east-west route, and a 13th-century Ugaritic text refers to it as a regular participant in exactly this type of trade (Heltzer 1987; Sherratt and Sherratt 1993: 361; Sherratt 1998; Peltenburg and Pickles 1998; Cline 1999: 124-5). Although the LM IIIA: 2-IIIB period is usually seen as one of reduction in Crete's exchange contacts with the east Mediterranean region itself (Cline 1994: xvii, 10, 35; 1999: 121-2), the island maintained its own special relationships in other parts of the international exchange sphere. There are still Cypriot and Levantine imports at Kommos and Chania in LM IIIB (Watrous 1992: 159-60; 161-3; 181-2; Cline 1994: 10f; 61; see also Karageorghis 1979). In the late 13th to 12th centuries a large market for Cretan and Cretan-type ceramics developed on Rhodes; inscribed stirrup jars, probably to contain Cretan products, were made in west Crete in LM IIIB and exported to the mainland, the Cyclades and Cyprus (perhaps via Knossos); a substantial proportion of the Aegean and Cypriot ceramic material transported to the western Mediterranean gateways in coastal Apulia, Sardinia and Sicily was Cretan (Kanta 1980: 294-313; Catling et al 1980; Sherratt 1981: 187-8; Macdonald 1986; Watrous 1992: 179; Godart and Tzedakis 1997; Hallager 1985). The use of western and southern Cretan ports by those

engaged in return trade across the Mediterranean is seen in the appearance of pottery with strong relationships to Italian forms and fabrics, but locally-made, at Chania and Kommos.<sup>1</sup> Some probably imported Italian metal items appear in LM IIIB-C prestige-related contexts (Psychro Cave, Zapher Papoura cemetery), and in settlement deposits at LM IIIC Knossos and Phaistos (Hallager 1985: 296)<sup>2</sup>. A clear difference in the consumption context of imports is seen between Crete and Italy. Imported and imitated Aegean ceramics can be seen to function as prestige items in the south Italian context (and as such were a factor in social transformations in the region: see Marazzi et al 1986; Smith 1987; Vagnetti 1998). In contrast, locally-made 'Italian-type' ceramics in Crete have open shapes, rather than those suited to any precious contents, and their find contexts are often in dumps/occupation debris. These facts all suggest casual use and low added value, though the form must have had some novelty value. The limited distribution of these types to Cretan ports suggests that direct contact took place there with traders working in the west (of various origins): these traders may well have included Cretans, who brought back knowledge of various cultural forms to their home ports.

The aims or form of regular 13th- to 12th-century Aegean exchange activities in the west are still not clear; the object of the voyages (whether by Aegeans or Cypriots carrying Aegean pottery) has been argued to be western metals (Smith 1987; Bietti Sestieri 1988; Ferrarese Ceruti et al 1987). Along with the knife types mentioned above, it is likely that several other novel, added-value bronze forms arrived in Crete in the 13th century in connection with west Mediterranean contacts. These had become assimilated into Aegean cultural traditions by the 12th century: fibulae types and razors are cited by Hallager 1985: 295-6.

*New developments: changes in Crete's external exchange and internal production relationships in the ELA*

Ceramic imports and stylistic influences show that Crete continued to be in regular cultural contact with the mainland in LM IIIC, (such evidence is particularly strong in the Mesara area (Borgna 1994, 1997, d'Agata 1997; see also Warren 1983: 79, Hallager and Hallager 2000: 172-3 for Knossos and Chania). However, it was no longer a target export area for mass-produced Peloponnesian pottery, as in LM IIIB (Sherratt 1981), nor does it seem to have

<sup>1</sup> At the latter site appearing from the 14th century, but reaching a peak in the 13th. See Hallager 1985: 303; Watrous 1992: 175; 182; 1993: 87-88; Hallager and Hallager 2000: 163, 165-6, 194.

<sup>2</sup> There are higher concentrations of Italian and Italian-type metal objects in the 12th-century Dodecanese (Mee 1982: 45-6; Macdonald 1986: 145-6).

exported much fine pottery to the mainland. The Italian export connection for both Cretan and mainland pottery seems to have been reduced from the mid-12th century, as east Mediterranean links with this region strengthened. However, Cretan ceramic influences in Rhodes grew in the 12th century, and as I discussed in Chapter 3.2, Cypriot/Levantine imports and elements of influence on material culture in 12th-century Crete point to contact with this growth area (Macdonald 1986; Sherratt 1981). The near-absence of identifiable ceramic exports or imports between Crete and the east Mediterranean until the late 10th century (see below) is difficult to reconcile with the stylistic relationships of some Cretan and Cypriot fine pottery in the 12th to 10th centuries (Karageorghis 1967; Popham 1969; Desborough 1972: 57-63). We must assume that some movement of particular (value) types of ceramics did take place. In general, though, imports from the east Mediterranean seem initially characterised by high intrinsic-value commodities/materials such as bronze, gold and iron, all discussed in the previous chapter. Real growth in the quantity and diversity of eastern ceramics on Crete did not take place until the 9th century (Coldstream 1979, 1984a), and the varied consumption contexts for these products and their local imitations mean no easy generalisations can be made about the nature of interaction with the east. Phoenician transport jars are found in late 10th-century and 9th-century dumps at Kommos as if casually discarded, their contents presumably more important than the pots themselves (Shaw 1989, 1998; Shaw and Shaw 2000). By the 9th century, small, fine Cypro-Phoenician Black-on Red juglets are functioning as prestige items in Cretan tombs, and are eventually locally produced and consumed. Again their contents may have been the original reason for their presence (and for their value) but these contents were strongly-enough identified with the containers to make the whole package of high added value (Coldstream 1984a: 137). By the 8th century a variety of eastern forms (other Phoenician juglet forms at Knossos, an inscribed Phoenician letter on a pithos in a tomb at Gavalomouri, and the increased volume and spatial spread of Black-on-Red juglets in Crete, culminating in local mass production), suggest that regular contact was occurring at a variety of social/economic levels (Tzedakis 1979; Coldstream 1979, 1984a, 1998a; Andreadaki-Vlasaki 1987; Hoffman 1997: 67-69, Coldstream 1998a).

Crete's links with the central Aegean were on a different, much more extensive scale than the contacts with the east in the 12th to 10th centuries. This is seen from the Protogeometric influences on the SM style at Knossos, and in the imports of Attic PG pottery there from the 10th century (Catling 1977: 12-14). Though Attic and other imported Aegean ceramics were still treated as value goods during the 9th-8th centuries, and were concentrated particularly in central Crete (Coldstream 1979: 88-9; Coldstream 1996; Coldstream and Catling 1996: 716-7), ceramic development across the island shows the full permeation of their



stylistic influence. An element of regional specialisation in the production and marketing of value-added products (as represented by the Cypriot unguent flasks and Attic/Euboean drinking sets) seems to apply in the Aegean/east Mediterranean into the 9th century (Coldstream 1979: 261; 1986; cf. Sherratt 1981: 189). Crete consumed them all. The 'cultural eclecticism' visible at Knossos and, I have argued, elsewhere in the island, must have represented a significant demand stimulus (Whitley 1991a: 186-7).

Most illustrative of the late 10th- to 9th-century increase in production and circulation of value items in Crete is the appearance of a higher number of large bronzework pieces like the lotus-handled bronze bowls, plain bowls and jugs, and of large quantities of carved ivory recorded at the Idaean cave and in the tombs at Knossos (Hoffman 1997: 24-38; 53-65; 109-136; 147-8; 153-189; Sakellarakis 1992, 1993; Coldstream and Catling 1996). Crete's lack of access to its own high-value raw materials, as always, contributed to making it a high consumer of imports, but this disadvantage may also have provided a long-term impetus to local manufacture, as well as to better-organised procurement (Matthäus 1998: 127-9; Hoffman 1997: 247-60). The rise of social and economic complexity from the 10th century produced the right conditions for development of production (see previous chapter). By the first half of the 9th century Coldstream points out that the Attic imports to Crete, now increasingly mixed with ceramics from elsewhere in the Greek world (Euboea, Corinth), were of types which indicate deliberate procurement (Coldstream 1996: 137; see also Coldstream and Catling 1996: 716-17). A example cited is the very large Attic E-MG amphorae, deposited in a completely different way than at Athens, where they were part of a tight symbolic system<sup>3</sup>. The number of these bulky, fragile imports, clearly treated as high-value commodities, at Knossos points to an steady, investment-worthy demand for very specific types of exotic goods by (parts of) a well-resourced society.

The picture of organised production and procurement, rather than the luck of enrichment from passing trade, which emerges from the above discussion indicates that the social context of long-distance exchange interaction had changed by the 9th century. However, throughout the whole period of the 12th to 8th centuries Crete seems uniformly characterised by a lack of activity in the export of its own manufactured products (Coldstream 1979: 70). It is still unclear what was supplied in return for the high-value imports received (although Matthäus 1998: 134 and Lebessi 1996: 146 suggest the production of specialised bronzework for export to the Greek mainland as early as the late 10th-mid-9th century). While other areas

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<sup>3</sup>At Knossos they never contain cremations, and do not have appear to have specifically female associations.



of the Aegean joined fully in the growth of the import-export trade, Crete seems to have articulated in a very particular, restricted way with the expanding world-system, responding mainly through inward investment in the production of high-value goods. It may be that Cretans were themselves in many cases the agents of trade between the east and 'termini' like Athens and Lefkandi<sup>4</sup> as these areas expanded their import/export activity with the east Mediterranean from the late 10th/early 9th century, but if so, it is remarkable that no attempt seems to have been made to exchange Cretan products in quantity abroad. Textiles, oil, wool or other perishables may have been significant Cretan exports (as in the LBA and C-H periods). While traces of these would not survive well, it is surprising that no exported Cretan transport vessels, e.g. for oil, are found, if the trade was significant in volume. The idea of the island as a transshipment point and market for growing cross-Mediterranean traffic, is probably closest to the truth (Negbi 1992; Markoe 1998: 236). It probably furnished subsistence goods to passing ships which plied the intra-Aegean routes to its north and trans-Mediterranean routes to its south.<sup>5</sup>

In view of Crete's somewhat idiosyncratic role, it certainly seems appropriate to see EIA long-distance exchange in the Aegean as a 'nested' form of world-system interaction (Chase-Dunn and Hall 1993). In Crete (and specifically its ports) the already institutionalised, complex systems of the Near East were articulating indirectly with developing production areas in Athens and elsewhere - i.e. there was contemporary interaction between at least three types of socioeconomic system. The position of Crete as a 'border' between two zones with very different contexts of production and consumption, together with the fact that rapid processes of commodification of some value goods, particularly iron, were occurring at this period, might lead us to expect very specific effects on the Cretan society, particularly in the form of early and strong forms of control on access to goods emanating from the east Mediterranean core area (cf. the model outlined by Kipp and Schortman 1989; Chase-Dunn and Hall 1993). I have already argued for a variant on this model, in which the existence of *other* forms of social control prevented the need to ration access to value goods or restrict their deposition. It seems that true secondary state formation models, describing the stimulus of a peripheral area to full engagement in exchange practices, i.e. the production of high-value exports, do not work for Crete at this period, though they may apply in other areas of the EIA Aegean. While the stimulus of increased availability of value goods does seem to have promoted the development

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<sup>4</sup> Coldstream 1979: 71.

<sup>5</sup> Markoe also suggests organised exploitation by easterners of Cretan iron sources in this period, but there is no good archaeological evidence for this.

of social and economic complexity in the island in the 10th and 9th centuries, there was apparently limited destabilisation of social systems, and the predicted economic response of reciprocal engagement in the export trade did not occur.

*The role of Cretan non-elites in long-distance exchange*

In Crete, I argued that downward convertibility and a kind of market system for value goods may already have operated in the 12th and 11th centuries and have grown substantially through the period, facilitating the participation of non-elites in long-distance exchange. Some scholars are less willing to address a significant role for non-elite demand or engagement in long-distance trade. Crielaard suggests for the period of the 12th to 10th centuries, and Small for the A-C period, that elites were the main or only social group involved in the conduct and financing of long-distance value goods exchange (Crielaard 1998: 191; Small 1998a). Crielaard's supporting argument is that the consumption contexts of the set of international prestige items he identifies are similar enough to suggest direct exchange contact at the same (high) social level. But as I have noted, closer examination shows significant regional differences in the consumption of value goods as part of status construction. In the LBA, gift exchanges between elites in highly contrasting regional socioeconomic frameworks had been couched in terms of equality which were clearly highly formalised and symbolic (Liverani 1987). In this light we should not expect so-called 'elite' interactions always to represent the reality of social relationships during the EIA, a period at which, in any case, social mobility seems to have been generally high. Arguments against using elite gift exchange as an all-encompassing model for interregional contact at this period gain support from contrasts in the different *concentrations* of the same types of high-value goods deposited in Cyprus and the east Mediterranean, Crete/Euboea/Athens, and other areas of the Aegean. These contrasts suggest, as well as differences in regional socioeconomic context, the directionality of exchange.<sup>6</sup> The fall-off pattern fits better to opportunistic, socially wide-ranging trade than to socially restricted gift-exchange (though increased proximity and contact might well favour the promotion of more elites and in turn promote more high-level contacts for a region like Crete).

It seems best to accept the co-existence of elite gifting with various other types of interaction with the long-distance exchange sphere throughout the EIA. Winter highlights the silver bowls in the *Iliad* and the *Odyssey*, which are referred to as having their own

<sup>6</sup> The pattern I have described may not be wholly (although I think it is mostly) attributable to exchange fall-off. Higher levels of raiding or piracy in coastal/island locations may also have been partly responsible for greater concentrations of value goods there.

'genealogies' of exchange history within the Achaeon elite, and between this group and Phoenician rulers, alongside references in the same epics to a very different dimension of interregional trade - eastern merchants engaged in profit-led exchange (Winter 1995). Morris stresses the economic value of gift exchange between pretended 'equals' - whoever they might be - in providing a 'front end' or acceptable social framework for the more commercial, more socially inclusive trade which he agrees must have existed at this period, and which dealt in some of the same products (Morris 1986: 6; Matthäus 1998: 141). It seems that a gulf in relative social status, masked in formalities, might frequently have existed between actors in interregional exchange. Cypriot/Levantine commercial traders arriving anywhere in the Aegean could often have been received in some kind of 'status' guise, as Morris describes, citing the ambiguous chief/trader identity and ceremonial reception of the disguised Athena in the *Odyssey* (Morris 1986: 5-6). A contemporary Afghan example, cited by Helms, is of interest in this regard (Chaffetz 1981; Helms 1988: 152). In this society, personally competitive community leaders felt responsible for displaying hospitality and generosity to strangers/travellers in the same way as they did for their own communities. They represented their strength of position through generosity, and benefited in turn by acquiring goods of prestige/preciosity value which boosted their status in their own communities. Leaders might 'buy or beg rarities' from the guest which would be unique in the village (Chaffetz 1981: 158). Another example cited by Helms is of the Asante in West Africa, among whom it was even more important to gain prestige by entertaining foreign traders/embassies than to acquire valuable items from them (Helms 1988: 156). If similar social accommodations took place in the EIA Aegean, the associated ceremony would both facilitate the exchange of the items traders/travellers had brought and generally enhance the value of these items. By the 8th century at Kommos, the establishment of a temple with overt connections to eastern cult practices suggests that such visitors, whatever their status (and the bulk transport vessels found on the earlier temple site from the late 10th century onwards suggest some of them were involved in large-scale, lower-value exchange) were still engaged with in a highly ritualised fashion (Shaw 1989). The gradual replacement by the 8th century in most Aegean societies of personally-orientated gift exchange and consumption by public, sanctuary-related deposition of wealth items, and the role of this change in reducing social friction which accompanied the growing volume of value goods available, has been much discussed (Snodgrass 1980a: 52-63; Morris 1986; Mazarakis-Ainian 1997: 393-396; Morgan 1995: 191-235; Morris 2000: 273-80). As I have already outlined, the same kind of change is seen in Crete, with a rise in value good deposition at public sanctuaries by the 9th century, if not earlier. These intra-societal changes may have the same broad meaning as the new mechanisms of long-distance exchange

involving non-elite traders exemplified by the Kommos temple. Both seem to accommodate the widening of physical and social access to the exchange of value goods. But the ritualised form of interaction at Kommos suggests that direct participation in exchange with people from overseas was still socially circumscribed. Elites could not directly compete in the acquisition and consumption of value goods from outside, but neither could non-elites participate without control in this kind of aggrandising activity.

#### *Internal circulation of imported goods in Crete*

In view of the variable social contexts of exchange at this period, it is difficult to see the circulation of imported goods within Crete as straightforward, although it has sometimes been presented in this way. On the basis of imported items at LM IIIC-G Arkades, Kanta and Karetsou suggest that a harbour site existed on the south central coast between Keratokampos and Tsoutsouros, arguing that the imports must have gone directly to Arkades, the nearest settlement, after entering the island (Kanta and Karetsou 1998: 171). Shaw suggests that the 9th-century metal imports at the Idaean Cave were brought there directly by easterners who landed at Kommos (Shaw 1989: 182). Alongside these somewhat over-direct interpretations, the possibility should be considered that the Knossos harbour area and other ports, including (by the 10th century) Kommos, served as gateways for imported value goods, and that indirect dispersal of these items took place through exchange, over time. Kanta and Karetsou themselves note the large amount of Knossian ceramics at G-O Arkades, which might suggest the same channel for the arrival of some later imports at the site, although this ceramic link is not apparent in LM IIIC-SM (Kanta and Karetsou 1998: 171). As early as the 12th/11th century, Knossos and its area was probably an important articulation point for imported goods and local specialised production and exchange (Negbi 1992: 607). Evidence includes the number of exotic items in tombs at Knossos North Cemetery. The pattern of central Cretan concentration of many imported and imitated 'exotic' items is perpetuated in the 10th-8th centuries - illustrated by the Idaean Cave ivories and bronzework and the rich contents of the cemetery at Eleutherna as well as by the North Cemetery (Coldstream 1979: 281-8; Stampolidis 1990, 1998; Coldstream and Catling 1996; Hoffman 1997:54-65, 30-37). The role of Kommos and the Mesara region as a contact point with the outside world (particularly for the Amari valley and Psiloritis area) was also significant (Kanta and Karetsou 1998: 171). The example of the 9th-century Gortyn tholos tomb, where the assemblage included a number of imports and showed strong Knossian links in the pottery, suggests that the important Minoan and historical route between the Mesara and Knossos had come back into regular use by this

time (if not earlier), and is likely to have facilitated the spread of imports in the region (Coldstream 1977: 48-49; 271).

The existence of two important gateways in north and south central Crete undoubtedly lies behind the concentration of value item circulation in this area (Desborough 1972: 237-238). From the 10th century onwards, central Crete saw the rapid growth of numerous large inland settlements established in LM IIIC. The development of economic complexity connected with this development may well relate to the effects of early intensive involvement in the exchange (and production) of high-value goods. By the 9th-8th centuries, more formal, structured roles in production and exchange for different settlements had almost certainly emerged. Knossos and Phaistos/Kommos probably always had a different role from that of the inland sites in articulation with the outside world (see Chapter 3.1; Whitley 1991b: 360-1) but systems of circulation of imported goods, and internal economic relations, must have become increasingly complex with the rise of other large polities.

### *Immigration*

Imported/exotic artefact types have often been cited as evidence for immigrant presence in Crete at this time (e.g. Boardman 1967; 1970; Catling 1995, 1996a; Hoffman 1997). However, it is not clear that these, or any other element of material culture, reflect a high level of permanent immigration. Pottery styles show that Crete was in touch with the Aegean mainland throughout the EIA to an extent which suggests regular cultural contact, potentially including some settlement in the island. But as I have shown, the exclusively high-value character of east Mediterranean imports in Crete in the 12th to 10th centuries makes it very difficult to argue for immigration from or via that region.

The quantity of high-value items which were locally made, though of exotic (east Mediterranean) type, from the 10th century onwards indicates a growing base of craft specialists on Crete (Hoffman 1997: 248-260). Although these people might conceivably have learned some skills abroad or from visiting craftsmen, they are in many cases just as likely to have imitated techniques of manufacture seen on contemporary imports.<sup>7</sup> As Hoffman shows, the view that the Aegean was so deeply sunk in a cultural regression from the 12th century that it required the physical presence of highly-skilled foreigners to manufacture value goods in the area (which lies behind many immigration hypotheses) is now less entrenched. The step up in

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<sup>7</sup> Perhaps less likely in the case of items showing very highly-specialised techniques with a clear east Mediterranean pedigree, like the gold jewellery from the Khaniakos tomb at Knossos (Boardman 1967).



the whole context of both production and consumption of value goods in the 10th to 9th centuries seems related to a number of complex factors, rather than simply the arrival of immigrants. Nevertheless, views supporting immigration on a large scale into EIA Crete still exist, and their proponents tend to apply the same kind of conclusions wherever imports or overt stylistic similarities with exotic types are seen in the artefact record. For example, Catling makes little allowance for the existence of exchange mechanisms or for the importance of particular consumption contexts in the acquisition of exotic-type goods (whether imports or local products), insisting on the movement of people as an explanatory mode (Catling 1996c: 644-9; 1995: 128). Discussing the rich burials 186 and 200-202 at Knossos North Cemetery (of 11th-century date) he suggests that

'The warriors of the N Cemetery might have been ethnic Cretans who had travelled widely in disturbed times, eventually to return to their former homes for a fresh start in a world changed out of recognition since their departure, or they may have been of wholly alien stock, from that cosmopolitan world from which, for instance, Cyprus must have been peopled as the Late Cypriot period came to its close.' (Catling 1996c: 646).

Catling seems right to highlight the potential confusion in trying to ascribe such individuals to any ethnic group. But his whole approach to the issue may be questioned (Whitley 1998b). The interregionally-shared recognition of some status-linked attributes in artefacts, brought about and maintained by exchange, seems most convincingly to explain why we see a specific range of 'exotic' associations most clearly in rich burial contexts, and is a strong argument against attributing the graves highest in exotica to immigrants. Another argument for immigrant communities existing separately from indigenous ones in 12th- to 11th-century Crete has been based on the location of burial grounds at Knossos (Coldstream and Catling 1996: 715). The apparent spatial separation between LM IIIC and 'SM' burial areas at the site is attributed by Coldstream to the arrival of a new group of people (Coldstream 1994: 115). This argument is difficult to sustain, given a) how little we really know about the extent or organisation of the settlement at LM IIIC-SM Knossos, b) that it is again based on mortuary practice - a highly symbolic cultural arena - and c) that it is partly founded on a very firm chronological separation of LM IIIC and SM ceramic styles. This last is problematic in itself (see Chapter 1.2) and is stated by Catling in the North Cemetery publication to be drawn somewhat unconventionally *because* the excavators wanted to link the start of the cemetery to a clear ceramic horizon (Catling 1996a: 295-7).

Another example of ethnocentric interpretation for this period in Crete is the notion that 'Mycenaean' elements seen in LM IIIC material culture reflect significant immigration into the island from the Greek mainland in the 12th century. This idea, like the theory of late



12th/early 11th-century Cretan migrations to Cyprus, finds cautious and balanced expression in the work of Desborough (Desborough 1964: 192-4; 235-6; 1972: 57-63). Desborough based his arguments on connections in various aspects of material culture, some of which I have cited above as better-explained by exchange relationships. Strong and regular contact with mainland cultural influences can be already be seen in Cretan architecture, as well as in ceramics, during the 14th and 13th centuries BC,<sup>8</sup> so that it is difficult to pinpoint a single period of cultural change likely to relate to immigration. Even for LM IB-IIIB, a period supposed to begin with significant Mycenaean immigration to Crete, the deposition in graves of mainland-linked items has proved extremely difficult to link to an actual mainland ethnicity, as opposed to a conscious affiliation, for the individuals concerned (Preston 1999). For LM IIIC, van Effenterre's attribution of rich tombs with fine pottery stylistically paralleled in mainland Greece to 'Mycenaean' identities persisting in the island from LM I times, rather than addressing the social meaning and context of the assemblages, is questionable<sup>9</sup>. Similar objections apply to suggestions of an ethnic mixture at the site of Arkades, based on the character of the LM IIIC-G tomb material and funerary rites:

'It seems that here we have a population of mixed origin (Minoan and Mycenaean) and a common past, who survived into the Iron Age and retained their cultural traditions and identity, perhaps living together with a foreign community connected with all the exotica found at Arkades.' (Kanta and Karetsou 1998: 170; cf. Boardman 1970: 20-1).

Such vague 'connections' made between exotica and the presence of foreigners benefit from re-examination with reference to the social context of value good consumption at this period.

Ancient sources referring to the movement of Sea Peoples have been cited in support of migration events affecting EIA Crete, and the significance of Doric as the dominant form of Greek spoken and written in A-C Crete has been used in a similar connection.<sup>10</sup> Textual evidence for the EIA Aegean in general seems to highlight the importance of *conscious/proclaimed* ethnic identities (see Chapter 4.2). We should not fail to recognise the constructed nature of such units (often closely linked to/overlapping with other emergent collective identities). The economic role of ethnicity in the EIA has only recently been brought to the fore in archaeological interpretation: the growth of various scales of ethnic consciousness must have been important in creating and maintaining long-distance exchange relationships and in market development (Sherratt and Sherratt 1993: 366; 1998: 335). This partly explains the

<sup>8</sup> Hayden 1993; Sherratt 1981, 1998.

<sup>9</sup> He cites tombs at Milatos, Mirsini and Mouliaia (van Effenterre 1991: 202).

<sup>10</sup> See Nowicki 2000: 257-63; Hall 1997: 2-13; 38-9; 155-79.

rather flexible/negotiable character of cultural manifestations of ethnicity through the period.<sup>11</sup> While iron and other commodities from the east could find a status market in the Aegean in the 12th and 11th centuries largely *thanks* to their 'exotic' characteristics, changes in social and economic relations there by the 8th century resulted in elements with perceived eastern connections (including iron, and Crete and the Cretans) holding ambivalent status with regard to a pan-Hellenic identity (Sherratt 1994; 1996; Morris 2000: 228-38). The strengthening and development of some concepts of ethnicity in the Aegean probably occurred in the 10th-9th centuries, as the increasing volume of value goods in circulation demanded new social responses (see Chapter 4.2).

From the above discussion it appears that the use of cultural elements with secondary 'ethnic' or regional attributions to identify the settlement of immigrant groups often ignores the constructed aspects of their original meaning. It is possible, however, that some areas of Crete did see the settlement of traders or travellers from the east Mediterranean. Such settlement may well have been successful in this period of relative political and economic opportunism. That strong potential for cultural integration existed in Crete is shown by the Kommos temple and its Phoenicianising installation. But the lack of many parallels to this argues against large-scale immigration from the east at any time between the 12th and 8th centuries.

### *Conclusions*

The main elements affecting the circulation of value goods in the Aegean from the 12th century were as follows - 1) *New social structures* allowed a larger number of individuals/groups to compete in this sphere, giving rise in turn to further social change: 2) *New types of value goods/materials became recognised*; supply and demand structures were transformed. These generalisations for the Aegean are true for Crete, whose place in the path between core and periphery heightened the challenge of reconciling participation in wider economic systems with internal social stability.

From the 12th to 8th centuries we can identify several main ways in which exchange-based interaction with the outside world related to socioeconomic developments in Crete. These are: participation (as a 'way-station') in cross-Mediterranean trade, and the likely physical

<sup>11</sup> They cite, for example, the malleable nature of 'Aegean' identity in material culture, with the adaptation of LBA and EIA Aegean artefact types into Cypriot production (sometimes in different materials) for export back to the Aegean or to the Near East with a layer of added 'exotic' meaning, different in each consumption context.

participation of Cretans in 'commercial' exchange abroad; opportunities for procurement of high-value goods at various social levels and through various forms of interaction (with a strong downward convertibility dimension in exchange within the island); and over time, the development of a production context for large volumes of value goods for local consumption, rather than for export. A significant rise in Crete's external contacts can be placed at earliest in the late 10th century; a date paralleled at Lefkandi (Popham, Sackett and Themelis 1990: 358-9; Popham 1994; Hoffman 1997: 257). The occurrence at the same period of changes in several other spheres of life in Crete suggest that it was a kind of turning point. In the next chapter I will discuss in detail the character and chronology of 10th-century and later settlement developments.

## Part 4

### Developments in Cretan settlement, society and economy from the PG period: the roots of the state

#### Chapter 4.0

##### Introduction

Osborne's observation on the relationship of settlement and society in mainland Greece may apply on only a limited basis elsewhere:

'Depopulation and disruption were such that continuity of occupation from the end of the Bronze Age to Archaic times can be demonstrated at hardly a handful of sites in the whole of Greece. It is clear that the human landscape of Archaic and Classical Greece was a creation in a space *uncontrolled* by earlier occupation.' (Osborne 1987: 57).

In Crete, there was a strong element of continuity of occupation into Archaic and Classical times at settlement locations established in the 12th century. Willetts recognised this when he wrote of the Cretan EIA defensible sites:

'After about 800 BC such places had been abandoned if they were inaccessible, or developed into city-states if their situation was more congenial' (Willetts 1977: 150).

Knowledge of EIA sites in Crete has improved significantly since Willetts' observation was made, and on this basis it is possible to investigate in detail the meaning of settlement change in conjunction with the rise of the state in Crete. Analysis which uses as its chronological starting-point the LBA/EIA transition, attempts to better theorise the meaning of settlement at this period, and treats state emergence as a product of a complex set of socioeconomic factors, making some use of processual analogy, seems most useful in this (Morris 1991:26; Snodgrass 1991: 3). In contrast, Nowicki's approach to settlement in PG-A Crete (his is the most recent overview of the subject) tends to pay minimal attention to the role of existing (and altering) local socioeconomic relationships in the development of larger communities at nucleated settlements, and favours determination of events by degree of external threat and/or immigration (Nowicki 2000: 241-7).

In Part 4, I first discuss the PG-A settlement data on its own. I look at the common characteristics of settlements which developed through the PG-A periods, contrasting them with those of abandoned sites to elucidate the importance of various physically-related factors in settlement change. I then turn to changes in socioeconomic and political relations through the same period, and how these relate to the changes in settlement.

**Chapter 4.1****The nature of settlement change from the PG period***The nature of the field evidence*

I refer in the first part of this chapter mostly to the development of the defensible site pattern, and leave other types of site until later in the discussion. From the case studies in Part 2 we saw that the range of settlement movement between the LM IIIC and the PG-A periods was often very limited. Settlement either relocated within the same small region (e.g. in the cases of Lato and Anavlochos) or remained and expanded at locations established in LM IIIC (Chamaizi, Profitis Elias Rokka and Korifi). Both of these patterns are widely paralleled elsewhere in the island, as Nowicki's work has shown (Nowicki 2000: 241-7). The dating of this 'watershed' in settlement development is supported by a combination of negative and positive evidence. First, there is the absence of post-LM IIIC-SM pottery on many of the small and highly-defensible sites previously occupied (though some do have small quantities of PG material). Second, there is the expansion of the settled area from PG onwards on sites occupied from LM IIIC. This can mainly be seen from surface pottery scatters, where it is indicated by small quantities of LM IIIC-PG, relative to PG and later, pottery. However, much early material may have been obscured by later developments, and reliance on surface material is not wholly satisfactory. I discuss the limited evidence from excavations below. From this combination of evidence we can identify a population focus at fewer, larger sites as occurring from the first half of the 10th century. The continued presence of PG material in small quantities on some sites means the process of abandonment was often gradual, and must be given a fairly wide chronological span, perhaps covering the whole 10th century<sup>1</sup>.

The expanding sites usually provided a larger settlement area. They were less inaccessible, and more conveniently sited with regard to prime arable land and to natural communication routes. There are important exceptions to this - LM IIIC sites of a highly defensible character which continued to be occupied from PG-G/A (discussed below). In general, though, the pattern is striking. 39 large sites of the type described above are occupied in PG-A (50 sites of post-PG date are listed by Nowicki in total).<sup>2</sup> This contrasts with the 120+ settlements identified for LM IIIC-SM (Figures 4.1-1, 4.1-2). The reduction in overall number,

<sup>1</sup> Limited occupation lasts on some largely-abandoned sites through PG-G; see discussion later in this chapter.

<sup>2</sup> 57 *poleis* are known from textual sources to have existed on C-H Crete (Chaniotis 1995: 55, note 93).

together with the increased size, of settlements clearly indicates a degree of nucleation - although the number of *very* small rural settlements of non-defensible type probably expanded once large nucleations were established (especially from the G period; see below). I discussed priorities in LM IIIC settlement in Chapter 3.1 above, and will now examine how these seem to have altered from PG. New factors were clearly influencing both settlement location and size.

The picture of EIA settlement is never static, since some sites continuing from LM IIIC are abandoned after PG but before A. However, a clear general phasing is identifiable in developments. The few abandonments between the PG and A periods do not give the impression of 'unstable' settlement, since these sites had by this time already been occupied for 400-500 years. It is the chronological overlapping of developments (these later abandonments, together with the widespread abandonments occurring from PG, alongside some of the earlier (rare) abandonments of highly defensible sites within LM IIIC) which can give the impression of 'instability' expressed by Whitley (Whitley 1991b).

We see the basic map of A-C *poleis* very clearly emerging in the PG and later settlement pattern. Concerning the development and relationship of settlement in the period leading up to *polis* formation in the Aegean, various observations have been made which seem to have relevance to Crete. Wallace-Hadrill suggests that 'if we look for a physical relocation rather than an act of political unification, the polis disappoints us, for what is found is an extension and elaboration of rural settlements, not the converse.' (Wallace-Hadrill 1991: xii). Snodgrass identifies several patterns of settlement development in the EIA, of which one appears to him most convincing as the basis for the *polis*:

'the circumstances were not those relatively simple ones where a physical *synoikisomos* took place, with part of the population moving to a newly-established urban nucleus, nor those even simpler ones of the colonisation of a new locality. In other words, we assume that there was a pre-existing settlement, whose status was now transformed through its becoming the centre of a polis.' (Snodgrass 1991a: 6).

For Crete, Coldstream tries to reconcile Aristotle's account of the formation of the *polis* through nucleation from a number of small settlements with the apparent existence of a large 'core' settlement area continuing from LM IIIC-SM at Knossos (Coldstream 1984b, 1991), while Haggis suggests that cemetery evidence might in fact support the notion of several smaller EIA settlements in the Knossos area (Haggis 1993: 162-163). All the above generalisations, which argue transformations in nature and meaning, rather than complete discontinuity, for EIA settlement, seem quite well to describe various aspects of Cretan settlement development and its implications. However, we should not expect generalisation to substitute for detailed regional studies.



Within Crete, regional differences are noticeable in PG-A settlement, just as in LM IIIC-SM. The east Cretan peninsula, as we have seen, had been characterised in LM IIIC-SM by numerous comparatively small, dispersed sites whose distribution seems most likely to relate to defensible topography and the exploitation of limited arable 'pockets'.<sup>3</sup> Although some of these settlements might have already have been linked to each other by through wider collective/collaborative relationships, based e.g. on kinship (Haggis 1993: 150-1), the large number of community groups here may well have taken longer than was the case in other regions to form physical nucleations, with the change in existing identity structures this would require. A somewhat divergent path for east Crete in PG-A is indeed suggested by the number of medium-sized continuing settlements, some of defensible type. By no means is the settlement picture complete even in this well-researched area, however.

In contrast to the situation in east Crete, many central Cretan settlements show a large size from early on, and there is a high degree of continuity, with few known examples of settlements abandoned from PG. The answer to the question of whence so many settlements drew their expanding PG and later populations may be partly indicated by the recent discovery of LM IIIC-PG settlements near Mires, at Grigoria Kartalos and at Pobia Vigla (Nowicki pers comm<sup>4</sup>; Nowicki 2000: 188-90, 221; Vasilakis forthcoming). These (particularly the first) are of fairly large size. However, the still-limited knowledge of this region through published survey prevents us from drawing too many conclusions on how nucleation occurred, although it undoubtedly did. Other areas waiting for further publication of research and analysis are the Rethymnon isthmus and Sfakia, where PG-A settlement explored through survey and excavation shows traces of a similar general pattern to the rest of Crete (Nixon et al 1988, 1989, 1990, forthcoming; Rocchetti 1994; Moody pers comm; Moody et al forthcoming).

Across Crete, a further degree of nucleation may be noted during the A-C period, suggesting that many factors which had influenced PG-A developments continued to be relevant. The settlement characteristics of this period are beyond the remit of my study, but their overlap with those of PG-A makes their main aspects worth outlining.<sup>5</sup> A proportion of the existing large settlements are abandoned from A, with concomitant enlargement of the continuing settlements. Considerable growth in the number of small rural settlements (almost

<sup>3</sup> As well as, perhaps, the lack of existing LBA centralised polities in this region and thus an already somewhat dispersed population (see Bennet 1987; Chapters 1.5 and 3.1). However, it may be carrying a desire for historical continuity rather too far to relate any aspect of PG and later settlement even indirectly to LBA settlement functions or distributions.

<sup>4</sup> Nowicki was originally informed about this site by L. V. Watrous.

<sup>5</sup> See, for example, Hayden 1995 for a much more detailed commentary on A-C settlement.

certainly relating to the expansion of political and economic territories), is seen. The growth of large coastal sites begins at this time (Faure 1959: 184; Haggis 1993: 159-60). Large PG-A nucleated sites which are abandoned in/from A include Azoria, Dreros, Anavlochos, Kalo Chorio Maza, and Kera Papoura (Haggis 1993; Chapter 2.2 above, Nowicki 2000: 167-70; 171-3; 175-7; Watrous 1980). Continuing sites (into the C and often the H period) include Eleutherna, Elounda Oxa, Gortyn, Polirinia, Praisos, Prinias, Rotasi Kefala, Anopolis, Astritisi Kefala, Arkades, Lato, Lyttos, Milatos and others, many of them well known as the sites of *poleis* (Stampolidis 1990; Themelis 1992; Bosanquet 1902; Mariani 1895: 244-6; Whitley 1998; Di Vita 1984, 1992; Rizza 1983; Rizza and Rizzo 1984; Nixon forthcoming; Levi 1931; Nowicki 2000: 173-4; 177-9; 190-1; 193-4; 221-2; 241-9; Chapter 2.2 above). Small sites of defensible type occupied from LM IIIC/PG through A but then abandoned are Kavousi Kastro, Mirsini Castello, Ayios Stefanos Castello, Drasi Xeli (Haggis 1993; Nowicki 2000: 71-2; 103-4; 112-3; see discussion below). Rare examples of sites of defensible type continuing post-A include Stavrochori Skalia in east Crete, Rokka in north-west Crete, and Traxilos (Kastelli) Selli, also in west Crete (Nowicki 2000: 218-9; 216-8; 222). The last two have continuous occupation from LM IIIC. It is unclear how it happened that these sites remained unincorporated in bigger nucleations by this late period, but it is most likely that they did so by agreement (*contra* Nowicki 2000: 247; see discussion below). Relative distance from a major nucleation might have been a factor in maintaining occupation at these sites, in contrast to the situation in A-C central Crete, where the concentration of large nucleations would not promote the survival of smaller defensible separate settlements.

The post-A pattern thus becomes complex in different ways, as *polis*, rural and coastal settlement all develop. It is still significantly under-researched, but important elements of it are obviously based in the PG-A pattern, itself developing out of the LM IIIC-SM settlement framework.

#### *Common factors in settlement characteristics, PG-A*

In the discussion below I will use the term 'successful' to contrast LM IIIC settlements continuing through PG-A with 'unsuccessful' ones, i. e. those abandoned in PG. The characteristics of successful settlement seem to relate strongly to the following considerations.

##### 1. New forms of physical security and protection from attack.

Nowicki makes the point that the abandonment of many highly-defensible sites by PG is likely to relate in some degree to a decreased amount of threat of attack from outside (Nowicki 2000: 241-9). Given that we see at the same time the expansion in size of many existing settlements,

the apparently decreased concern with security may also relate to a qualitative change in response to threat, relying on strength in numbers (Snodgrass 1991: 9) or to a change in the type of threat, perhaps the rise of interregional conflict within Crete. Certainly the PG-A settlements had topographical characteristics which helped ensure their security. Strategic views over a potentially large political territory were obtained from their locations on high points above the surrounding landscape. Many could only have been really defensible, however, by a large number of people or with the use of a fortification wall. There is thus a distinct difference between these sites and those of LM IIIC-SM in terms of type of defensibility, although a concern with defence is unmistakable in their siting.

## 2. Access to a large extent of arable territory

There is a significant, though not dramatic, contrast between the quality and quantity of land exploitable from the PG-A sites and from the abandoned LM IIIC-SM ones. This contrast is illustrated by the cases of Vrachasi Anavlochos and the Profitis Elias sites, where settlement longevity seems to be related to good access to a large amount of low-lying prime arable, and the Tapes sites, with their limited arable hinterland and abandonment from PG. In general, LM IIIC-SM sites whose prime arable hinterlands formed restricted pockets, or whose access to cultivable land was difficult, due to localised (defensible) topography, are disfavoured for PG-A settlement, while those whose surrounding hinterlands provided a bigger and more easily expandable arable territory in all/most directions are preferred. In central Crete, this criterion was met at most of the already-established sites - probably a major factor in why new locations were not used here in PG-A. Elsewhere, we can see examples of very short-distance movement to sites with access to larger arable hinterlands - e.g. the probable move from Kritsa Kastello and the Tapes sites to Lato. The same consideration also applies to the probable short-distance moves from Kalamafki Kipia to Praisos and from Erganos to Arkades, among many others. However, it cannot be seen as an adequate explanation on its own for the widespread changes in settlement. It relates very closely to the factors of access to physical, i.e. potentially political, control over a larger area and access to communication routes (see below).

## 3. Access to communication routes

This factor in settlement location is a difficult one to assess in Crete, where numerous valleys traversing and bypassing mountain ranges mean that most sites of any period are not far from 'communication' routes of some sort (see Chapter 3.1). PG-A favouring of sites closer to low-lying prime arable in many cases anyway put settlements closer to the valley bottoms or plains forming natural routes. This factor is not mentioned by Nowicki in his analysis of PG-A

settlement, but deserves consideration when trying to assess the implications of the shift (Hayden 1995: 93). Exemplifying an apparent concern with access to routes in PG-A settlement expansion are the locations of Sybrita (Thronos Kefala), Praisos, Kato Chorio Profitis Elias, Arkades, Lyttos, Kalo Chorio Maza, Profitis Elias Rokka/Korifi and many other central Cretan sites, Falasarna, Axos, and Polirinia.<sup>6</sup> Falasarna appears to have been occupied from LM IIIC through H-R times. Its lack of some of the characteristic attributes of PG-A site hinterlands (very extensive prime arable area/political territory) suggests that these considerations could in some cases be made up for by good access to sea, as well as land, routes (Gondicas 1988: 85).

#### 4. Room for expansion of the settlement area

We have seen that the largest LM IIIC-PG defensible sites were between 30 and 40 000 sq m in size. Not enough research has yet been made on the PG-A phases at the continuing sites to estimate average or maximum sizes, but surface material shows that where settlement continues, size always seems to expand from PG onwards. At Prinias, for example, a spread of the settlement area over much of the top and slopes of the hill is clearly seen by the G-O period, while stratified SM material is seen only in some places on the summit (Rizza 1983; Rizza and Rizzo 1984: 143). At Thronos Kefala the scatter of G occupation material is much wider than that of LM IIIC-SM, and by Archaic a process of expansion was well underway, with the settlement spreading over the N and S slopes of the hill (Belgiorno 1994: 205-6). Gortyn shows a similarly unmistakable expansion, from the Profitis Elias hill summit, where LM IIIC-SM occupation is located, down the hillslopes and onto the plain to the S by G-A (Di Vita 1984: 40). The PG-O size of Praisos, where only very limited settlement probably existed in LM IIIC-SM, grows to c. 180 000 sq m.<sup>7</sup> (Whitley et al 1999: 247) At Azoria, where minimal research has taken place to date, the final (A) size of the settlement is at least 40 000 sq m, many times bigger than the Kavousi Vronda or Kastro settlements nearby. Surface studies suggest a much smaller spatial limit for LM IIIC-SM occupation at the same site; further research may show much more detail of its PG-A expansion (Haggis 1992; 182-5; 1993:148-9). An important point emerging from study of the topography of the sites just discussed and of

<sup>6</sup> See Kanta 1994; Belgiorno 1994; Watrous forthcoming b; Frost and Hadjidaki 1990; Hadjidaki 1992; Nowicki 2000: 89-90; 175-8; 191-3; 221-2; Gondicas 1988 for information on the sites I have not previously referred to.

<sup>7</sup> In contrast to the c. 30 000 sq m of the main LM IIIC-SM settlement at nearby Kalamafki Kipia, the settlement it replaced.

other 'successful' sites is that whatever the actual size of a settlement in PG-A, the room for *potential* expansion is generally significantly larger than at the abandoned LM IIIC-PG sites. Exceptions exist, such as Kritsa Kastello and Loutraki Kandilioro, both abandoned by PG, although possessing fair room for expansion on the same site<sup>8</sup>. These seem to show that this factor only applies in conjunction with the other considerations in settlement location discussed here.

### 5. Visual symbolism

Consideration of PG-A settlements' landscape context highlights another factor which may have influenced of the pattern. As we have seen, the locations of successful sites are of a visually distinctive, impressive 'acropolis' character, and this almost certainly related to the perception of the emergent polities both by their inhabitants and by other communities in the region. The main settlements were no longer hidden in valleys (like LM IIIC-SM Erganos Kefali, Loutraki Kandilioro, or the sites in the Avgo and Potamoi valleys) or craggy and unassailable (the Tapes sites, Elliniki Korifi) - except in the cases of continuing defensible sites, such as Kavousi Kastro and Vrokastro (see below). The locations visually came out and proclaimed their status as the homes of new, expanded and more powerful political identities. From PG they must have simultaneously represented established focus points, drawing in people living in the surrounding area, and nebulous new entities, in the process of being defined against other nucleations. They commanded both visually and physically, at close range, a greater extent of low-lying territory than most of the LM IIIC-PG sites had done, a fact likely to have directly facilitated the maintenance and expansion of political and economic control at a larger scale. That the sites were at least partly *chosen* for the perpetuation of major settlement nucleations, rather than ending up with this status through completely variable processes of competition, is clear from the closely similar and contemporaneous nature of settlement development in all parts of the island from PG, and the fact that some of them are new or almost-new foundations (growing up on sites with very little LM IIIC-PG occupation, e.g. Kera Papoura, Rotasi Kefala, Praisos, Viannos Korakias: see discussion below). All the factors I have already cited must have been relevant in these choices. In the next chapter, I will discuss the conditions of socioeconomic change under which the choices were made.

*Continuity, expansion, communication and competition: implications of the post-PG settlement distribution for inter-settlement relationships*

<sup>8</sup> The continuing small defensible sites are other obvious exceptions.



In central Crete, the combination of large initial size, access to extensive prime arable areas and proximity to important communication routes made most LM IIIC-SM settlements ideally placed to compete and grow in the PG-A context, where these attributes characterised nearly all major sites and thus are likely to have been of rising importance. In LM IIIC-SM, communities at these settlements may have managed to enhance their fairly low intrinsic defensibility through a network of collaboration or the use of artificial fortifications. From PG, as we have seen, a combination of reduced outside threat and/or new forms of response to threat made this type of location less problematic. But the number of large settlements, and their success, in this region is likely to have made it the first in which regular inter-settlement conflict, linked to parallel expansion processes, began. The central Cretan nucleations could not for long, or without conflict with their adjacent peers, concentrate population from nearby smaller LM IIIC-PG sites (of which few are known). The development of external contacts, and the related rise in the circulation of and demand for value goods, concentrated on this region from the 10th century onwards must have contributed to friction between polities.

Nucleations outside central Crete, like Dreros, Lato, Kato Chorio Profitis Elias, Praisos, Arkades and Polirinia, differ from the central Cretan examples in that they were more obviously able to draw up dispersed local population over time. (as we see from the number of abandoned LM IIIC-PG sites in their regions). Alongside nucleation at continuing sites, a much rarer development is also seen - the use of new or almost-new sites, likewise in conjunction with the abandonment of nearby LM IIIC-SM settlements. This was the case at Viannos Korakia (apparently new), Rotasi Kefala, Kera Papoura and Praisos (all with very little trace of LM IIIC-SM use), to which the populations of the LM IIIC-PG settlements at Loutraki Kandilioro, Rotasi Korifi, Karfi and Kalamafki Kipia probably relocated (Nowicki 2000: 138-9; 190-1). The 'new' sites have all the characteristics outlined above as typical of preferred PG and later nucleations. Strong regional continuity, as well as the element of choice, is apparent in the proximity of the 'new' settlements to their LM IIIC-SM forerunners. At Kera Papoura, a location very close to LM IIIC-SM Karfi was chosen for the main focus of PG-A settlement. New small dispersed settlements in the area were also founded from PG-G (Nowicki 2000: 152-4; 166-7; 245); very similar LM IIIC-SM predecessors close by suggest the continuity of old relationships within the new settlement system. The main difference between all these types of site and the central Cretan type of PG-A settlement is the element of movement which takes place, but this movement is always tightly regionally bounded and reflects the same kinds of new priorities in settlement (discussed above). Another variation, somewhere on the spectrum between full continuity and relocation, is the perpetuation of settlement in the immediate vicinity of sites established in LM IIIC, but on lower-lying areas with more room for site



expansion and having some of the other newly-favoured characteristics, such as better access to large areas of prime arable and to communication routes. Such short-distance movement is seen at Gortyn, Males and Milatos, where the defensible LM IIIC citadel, limited in size, was no longer used for settlement, or became simply a small part of a much greater settlement, in PG-A (Nowicki 2000: 186-7; 134-5; 170). This is really just a variant form of the general expansion of settlement area at continuing sites, which I have discussed above.

I think the remarkable degree of regional tiedness in settlement is a factor likely to relate to strong lineage/clan or wider collective units established during LM IIIC community development (see Chapter 3.2 and Haggis 1993: 150-1; 1999: 307; Haggis forthcoming). However, archaeological evidence is not adequate to identify clear political boundaries as early as PG. Power relationships between small communities in any wider region and the major polity in that region must have undergone regular change from the PG period onwards, a process culminating in the interregional wars and boundary conflicts between A-C *poleis* (Willetts 1955: 225-49; 1977: 177-81). Regionally-based collective identities, while undoubtedly important in the establishment of the PG-A nucleations, were probably still very fluid at this time.

I will look briefly at some examples of settlement relationships in different regions in PG-A. Examination of the Ayios Vasilios and Amari valleys suggests that these two areas saw somewhat contrasting settlement developments in the period. None of the settlements at LM IIIC-SM Spili Vorisi, Frati Kefala and Kefali, and Atsipades Fonises show significant occupation after PG on the basis of surface material (although there is a little PG-G (possibly A)? occupation at Frati Kefala; Nowicki 2000: 201-3; Moody pers comm). In PG-C, several relatively small nucleations are known from the area, e.g. at Koxare Ambelos, Kerame Pyrgos and Kionia, and (Hood and Warren's) 'Site 12', east of Koxare (Hood and Warren 1966: 177-8; 180; Moody et forthcoming; Moody pers comm). However, there is not yet clear evidence for a single large settlement, of the order of PG-A nucleations elsewhere in Crete and forming the basis of a *polis*, in this region. In contrast, in the nearby Amari area, a large post-PG settlement at Thronos Kefala (Sybrita), grew up from LM IIIC (Rocchetti 1994; Prokopiou 1991, 1994, 1997). This site, and the nearby Pandanassa Veni, represent the largest known PG and later settlements in the broader area, including the southern Ayios Vasilios valley (Hood et al 1964: 70-71; Nowicki 2000: 197-9). Sybrita was a very successful *polis* lasting through Roman times. The settlement at Veni also lasted into H-R, but its political status is not known (Sanders 1982: 161). The success of Sybrita should be seen at least partly in relation to its position at the midpoint of the Amari valley, whose use as a major communication route across the island from the north to south coasts was established since at least the LBA (Kanta 1994;

Scafa 1994). Belgiorno (1994: 224) also points to the significance of the local accessibility of the site in its long-term political and economic development, noting the easy access between it and the smaller settlements which grew up around it in G and later.

An interesting element at Sybrita is the apparently restricted or specialised nature of its LM IIIC-SM occupation<sup>9</sup>, arguing against any view of this kind of successful site as victors in a conflict-based nucleation process starting from PG. The topographical characteristics both of this site and of Veni are open strategic vistas over the surrounding landscape, without extreme local inaccessibility (and thus extreme defensibility) although they have enough height and steepness of slope relative to the surrounding countryside to give them some local defensibility. The long use of artificial forms of defence are seen on the Kefala hill (vulnerable to approach on its eastern side), where a defensive perimeter wall was in existence by A at latest.

While they conform to many elements of the 'typical' pattern, the settlements at Sybrita and Veni pose their own particular set of questions concerning political developments in the PG and later period. Why did two large settlements flourish so close to each other in the Amari? Where was the territorial demarcation between the two settlements, and how soon did they (if ever) form part of a single economic/political unit?

The complex settlement system of the western Mirabello area, which from PG to A centred around Anavlochos, Milatos, Lato, and Dreros, is another interesting case for the discussion of community relationships at this time. The fact that these sites all apparently drew population from settlements in their close vicinities, like Neapoli Kastri, the Potamoi valley sites, Tapes and Kritsa Castello, illustrates the importance of tight regional links in PG-A settlement change. Although Nowicki argues that the coexistence of three powerful neighbouring polities in one small region relates to ethnic diversity, seeing Anavlochos as a 'Minoan' settlement and Milatos, in contrast, populated by incoming mainlanders from some point in its EIA development (Nowicki 2000: 244), it is not difficult to see in this case a very similar process to that which occurred elsewhere in Crete in PG-A. It appears that first the smaller LM IIIC-SM communities nucleated into the various polities, and latterly (from A) Anavlochos and Dreros themselves were subsumed into the *poleis* of Milatos and Lato.

#### *Site types other than the main nucleations in PG-A*

<sup>9</sup> Much LM IIIC ceramic evidence comes from pits, which also contain high quantities of burnt animal bone. Some buildings of LM IIIC date have also been uncovered, but the pits (some of which are earlier than any of the buildings) strongly suggest a special, perhaps ritual use of the site at this period (Prokopiou 1997; d'Agata forthcoming a).

Below I discuss a few examples which highlight specific aspects of the PG-A settlement pattern outwith the type of nucleations described above.

#### Abandoned LM IIIC-PG settlements

There is a distinct pattern of continued very small-scale occupation at some LM IIIC-SM sites which are otherwise abandoned from PG onwards (e.g. Tapes Kato Kastello, Frati Kefala, Atsipades Fonises, Oreino Kastri, Pefki Stavromenos, Vrises Profitis Elias (Nowicki 2000: 64-7; 73-8; 113; 123; 201-4; 204-6; Moody pers comm). Some of these have visually-distinctive visual characteristics, which might have favoured a function as landmarks or symbolic focus points in the expanded territories of the new nucleations. In the Karfi area, although the abandoned sites (Krasi Siderokefala, Krasi Armi) were replaced from PG with other small dispersed settlements (Krasi Kastello, Kera Kastello: Nowicki 2000: 152-70), as well as the large one at Papoura, the abandoned locations must have been regularly encountered in the course of daily subsistence activities, and community traditions almost certainly referred back to them. In the Ayios Vasilios valley, small-scale use of Frati Kefala and Atsipades Fonises continues alongside occupation at other sites in the area (see above) again suggesting some role for (nearly-) abandoned sites in new settlement relationships. At LG Vronda, the abandoned LM IIIC-SM settlement was re-used as a cemetery, seemingly indicating concern with perpetuating regional identity through reference to old habitation places (Gesell et al 1983: 394-409; 1988: 287; 297-8; Day et al 1986: 384-5; 387; Haggis 1993: 150).

#### Small-to-medium-sized defensible sites occupied until Geometric

Some highly-defensible sites established in LM IIIC continue to be fully occupied in the PG-A period, but do not expand in size. They are thus very distinct in character from the contemporary nucleations (Nowicki 2000: 245-6). Even allowing for area bias in fieldwork, the most numerous of these sites appear to be in the east Cretan peninsula, where it is possible that their continued presence represents resistance to the collaborative political units symbolised by the new nucleations (a view favoured by Nowicki; see Nowicki 2000: 247). On the other hand, they may have fulfilled special security functions (e.g. as refuge places) for, and through full sociopolitical integration with, the communities at the prospering nucleations (see Chapter 4.2). Examples include Kavousi Kastro, Vrokastro, Mythoi Zonari, Viannos Keraton, Mirsini Kastello, Anatoli Mesokastello<sup>10</sup>, Pefkos Boubouli<sup>11</sup>, Zakros Ellinika, Chamaizi Liopetra, and

<sup>10</sup> Only partial occupation of this site is seen in PG-A (Nowicki 2000: 128-9).

<sup>11</sup> Occupation here appears to continue into G only (Nowicki 2000: 135-6).

Stavrochori Skalia<sup>12</sup> (Coulson 1998; Hall 1914; Hayden 1983; Nowicki 2000: 54-5; 104-4; 112-3; 128-9; 135-6; 218-9; Vokotopoulos 1998; Chapter 2.2 above). Continued occupation on a small, not highly defensible LM IIIC-A site like Vrises Drasi Xeli may indeed represent a group who did not need or want to join their settlement base to one of the main nucleations in the (topographically cut-off) locality (Nowicki 2000: 112-3). The small PG-O/A sites I have already mentioned at Kera Kastello and Krasi Kastello, on the lower Lasithi foothills north of Papoura, are defensible (forming a 'network' like that seen in the area in LM IIIC-SM), but may also have acted as agricultural outposts. Their close relationship to the preceding settlement pattern, but new foundation in PG close to the emergent nucleation of Papoura makes them unlikely to represent communities 'resistant' to amalgamation in the wider political unit.

#### Dispersed, small- to medium-sized non-defensible settlements connected with agriculture

Although small- to medium-sized village settlement (i.e. in the range 10 000-30 000 square metres) becomes less significant overall after LM IIIC-SM, the PG-A pattern suggests a growing role for dispersed *very* small settlements, near to but separate from the expanding nucleations.

The existence of 'satellites' has already been noted around large LM IIIC-SM sites (Chapter 3.1). In my case studies, small sites were identified in the areas of Vrachasi Anavlochos and Chamaizi Liopetra.<sup>13</sup> Although these were unable to be dated very precisely, they were certainly in use from some point in the PG-A period. Around Thronos Kefala, too a spread of 'rural' settlement from G accompanies the growth of the main nucleation (Belgiorno 1994). At Kavousi, a small settlement at Panagia Skali grows up in the G period, probably as a satellite of Azoria (Haggis 1993: 151). I have already mentioned the probably agriculturally-related PG-A settlement pattern around Kera Papoura. Another, later group of settlements worth looking at in this connection is in the Meseleroi area, in the north-western Ierapetra isthmus (Hayden 1995). They are founded in O-A, and demonstrate a considerable spread of small settlement around large nucleations by this period. The pattern is of dispersed villages, (some with slight defensible characteristics, and one with a fortification wall), all somewhat removed from the main adjacent arable area. The dispersal, suggests Hayden, facilitated efficient land use as well as (interdependent) strategic defensibility. The pattern differs

<sup>12</sup> The latter does not show clear evidence of LM IIIC-SM occupation and seems to have grown up from PG onwards.

<sup>13</sup> At least one of the sites at Anavlochos (N of the ridge) was used from LM IIIC.

significantly from typical LM IIIC patterns in the density of very small settlements in a limited area, the lack of concern with independently defensible location, and the close connection with a large *polis* nucleation (starting in O/A) at nearby Oleros (Hayden 1995: 102).<sup>14</sup>

Given the number, size and spread of the main nucleations, it seems clear that by A, few small village type settlements in Crete had any degree of political independence. Few of the highly-defensible sites described above continue after this period, and the territory controlled by the nucleations was expanding to an extent that did not promote independence for communities of this size (see Perlman 1996).

#### Large coastal and low-lying/non-defensible settlements in PG-A

During the PG-A period, several sites of this type occupied in LM IIIC-SM continued to develop, and in some cases to grow. These include Chania, Phaistos and Knossos (Hallager and Hallager 1997; Rocchetti 1970, 1974; Cucuzza 1998; Hood and Smyth 1981: 13; Whitley 1986: 265-6). Direct stratigraphic continuity between the LM IIIC and G periods is difficult to demonstrate at any of the above sites, but the spread of evidence, certainly at Knossos and Phaistos, suggests continuity is likely. Given the new priorities in settlement location which I have identified as emerging in PG-A, it is hardly surprising that continuity and growth occurred at these locations. They commanded some of the largest and most generally accessible prime arable areas in the island, as well as major routes. Their topography was less defensibly/visually impressive than many of the other PG and later nucleations (although the Phaistos 'Acropoli Mediana', occupied from LM IIIC through PG,<sup>15</sup> is similar in topography to many of these sites), but their history of long-term occupation and their strategic locations *vis-à-vis* sea and land routes almost certainly counted for more than these other factors. The resurgence of the port of Kommos in the late 10th/9th century, in clear connection with renewed external contacts there, show the growing perceived importance of communication with the outside world, as discussed in the previous chapter. Phaistos and the emergent *polis* of Gortyn were well placed to benefit from the increased volume of trade at Kommos. As I have already discussed, signs of growth in external contacts at Knossos North Cemetery from the

<sup>14</sup> The details of A-C settlement in this region seen in the results of Hayden's survey work, and her thoughtful analysis of them, show how complex the Cretan settlement pattern becomes in this period, and how coarse are my generalisations made earlier in this chapter.

<sup>15</sup> Occupation continued here from LM IIIA-B and seems to have lasted until settlement became fully focused on the surrounding lower lying land (where LM IIIC-PG occupation was already established) from PG/G. See Levi 1956; Hayden 1988: 5-6; Cucuzza 1998.



PG period show the increasing importance of the site as an access point for exchange with the outside world, and the same applies to Chania, with its substantial quantities of imports by the G period (Andreadaki-Vlasaki forthcoming). It was probably from PG onwards, when communities in these areas no longer had to focus primarily on defensibility and were affected by a range of new factors, including the development of interregional, that these settlements began to come into their own again.

#### Extra-settlement sanctuaries

The upsurge in public sanctuary use which occurs on the mainland in the 8th century<sup>16</sup> is not so apparent in Crete, where earlier use was well-established of separate sanctuaries both within and outwith settlements. There is evidence for the continuous use from LM IIIC through PG-A of major extra-settlement sanctuaries, and signs of particularly intensive use from the 10th century onwards at several of these. Sanctuaries almost certainly used by a number of contemporary settlements through PG-A (and of varying local or regional importance) include the Idaean, Psychro, Patsos, Tsoutsouros and Amnisos caves, and Kato Simi (Sakellarakis 1983, 1987; Watrous 1996: 101-111; Boardman 1961; Rutkowski and Nowicki 1996; Alexiou 1963; Schäfer et al 1992; Lebessi 1975; Kanta 1991; Kourou and Karetsou 1994). There are some other examples of cult places established in or used more intensively from the 10th-9th centuries which seem to fall somewhere between specifically settlement-based/-linked and extra-settlement, shared shrines. Kommos (where an sanctuary complex was established as early as the 11th century and lasted into the C period), and Ayia Triada (established in LM IIIC but with expansion and increased volume of deposition from the late 9th through 7th centuries) were both probably closely linked to the settlement at Phaistos<sup>17</sup> (Shaw 1989; d'Agata 1998; Watrous 1996: 101-2). A single shrine at Thylakas (G-A) was probably linked to Lato, and one at Pachtitsani Agriada (SM/PG?-G) to Kavousi Kastro/Azoria (Alexiou 1956; Faure 1967: 122, 129; Sakellarakis 1972; Watrous 1996: 104; Mazarakis-Ainian 1997: 212). The temple of Diktaian Zeus at Palaikastro was founded in G-O or earlier (Bosanquet 1910, 1945). It appears from later texts to have had a status somewhat similar to mainland sanctuaries, with a wider regional catchment developing from the 8th century; it is not

<sup>16</sup> Snodgrass 1980a: 52-63; Rolley 1983; Morris 1987: 89-92; Sourvinou-Inwood 1993; Morgan 1993; de Polignac 1995; Mazarakis-Ainian 1997. See Sourvinou-Inwood 1993 for a view supporting more gradual change in the use of sanctuaries on the mainland.

<sup>17</sup> I mentioned the clear foreign connections of the Kommos temple through the 9th-8th centuries in the previous chapter.



associated with a contemporary settlement. In the next chapter I will mention some PG-A developments in the use of sanctuaries within settlements.

Whitley rightly stresses that the use of extra-settlement sanctuaries in EIA Crete was not so directly associated with the process of sociopolitical integration at individual proto-*polis* nucleations as it was on the mainland (Whitley 1986: 259). However, many of the sanctuaries listed above must have been shared in use by a number of PG-A nucleations, and this is likely to have promoted the collaborative and competitive inter-community relationships contributing to *polis* emergence.

### Conclusions

In the discussion above, settlement has been treated in a rather formalised way, with its physical attributes focused on as if they represented the full meaning of this cultural form. I have tried to isolate broad patterns and typologies, insofar as they may help us to appreciate the complexity of the data and its main characteristics. To go further in such analyses without evaluating the complex sociopolitical changes which must have accompanied settlement development would be of little interpretative value. In any case, we are restricted from making too many extrapolations from settlement data for this period by the nature of much of the evidence, which often consists only of surface finds.

In the light of the foregoing discussion, we can summarise the characteristics of the main PG-A settlements as follows.

1. They retain an element of defensibility, and are better-sited to command a wider political territory than the LM IIIC-PG settlements.
2. They are usually less topographically defensible than many of the LM IIIC-PG sites, and consequently often allow easier access to low-lying prime arable areas.
3. They are well-sited and accessible from trans-island communication routes.
4. Their distribution is fundamentally different from either LBA major settlement locations or the post-Roman settlement pattern in Crete. They represent the modification of a pattern first established in LM IIIC.
5. Most have a stable course of long-term development (the most successful going from LM IIIC on into the Classical and Hellenistic periods), and their meaning must thus be closely tied up with the rise of the *polis* state in Crete.

Rather than supporting Whitley's perception of much EIA settlement in Crete as 'unstable' (Whitley 1991b), the PG-A data illustrates a strong degree of continuity, *alongside* a clear readjustment of priorities which necessitated the abandonment of some settlements. The

defensible sites abandoned by PG had an occupation span of about 200-250 years, while those which continued until Archaic represented about 600 years. The contemporaneous nature of the PG changes (and the lack of outstanding size/success in LM IIIC-SM of many settlements which continued into PG-A), the small regional sphere in which movement took place, and the element of deliberate choice apparent everywhere in the island in continuing settlement location, all suggest that the change was unlikely to relate to fundamentally different, unstable social systems at the abandoned sites. Whitley does seem right, however, to highlight social/political factors as instrumental in PG and later settlement changes: this subject is explored in the next chapter.

The new, complex factors seen in PG-A settlement priorities and in the integrally-linked rise of the *polis* state during the same period seem inadequately generalised by Yoffee's observation:

'City-states grow from important pilgrimage sites, from market sites....from defensive locations (into which people flock)...from geographically favourable nodes in which one might control the distribution of water and access to prime agricultural land and trade routes, or (normally) from some combination of the above' (Yoffee 1998: 261)

In this analysis we can certainly recognise several elements relevant to the growth of the Cretan nucleations. But we cannot equate the rise of the *polis* in Crete with simple causative/functional factors in settlement. As Yoffee recognises, the city-state, like other state forms, represents 'crystallisation[s] of long-term, regional evolutionary trajectories toward increasing economic stratification and social differentiation.' The less tangible factors in the development of PG-A settlement must have included local historical circumstances (and historical consciousness), since the settlements are very strongly rooted in the LM IIIC-PG past. However, the widespread similarity of the developments across Crete, and the many common features which the rise of the state in Crete shares with other parts of the Aegean, indicate that the factors in play were not only local ones. In the next chapter I will look at the various scales at which history, social identity and macroeconomic conditions were integrated in the emergence of PG-A polities.

**Chapter 4.2****Socioeconomic change in PG-A Crete: the growth of complexity***The polis phenomenon and its relevance to the study*

The socioeconomic context of the emergence of the *polis* by the 8th-7th century, used as my end-marker, is rather better documented than that of the 1200 BC settlement shift, my starting-point. This is thanks to the fact that very similar developments occurred across the Aegean, and that texts start to illuminate these from the 8th century onwards. Using both cross-regional comparison and historical reference to enhance settlement and other archaeological evidence from Crete, I now discuss the elements contributing to increasing sociopolitical complexity in the island through the PG-A period.<sup>1</sup> Opinion still differs on whether the *polis* really emerged within the 8th century, or the turning point in sociopolitical development occurred earlier (Snodgrass 1980a; Hägg 1983; Morris 1987: 3; Hansen 1993; Raflaub 1993). Recognisably *polis*-type elements of social structure and the use of the term itself are first documented in Crete by an inscription of the mid to late 7th century at Dreros (Meiggs and Lewis 1989: 2-3). But large settlement sizes and characteristic cultural features are apparent already by the 8th century at what are later confirmed as the sites of *poleis*, suggesting that many elements of the form were in place by this period or earlier.

Significant regional diversity is observable in the history of the *polis* (Morgan and Whitelaw 1995; Charlton and Nichols 1998: 2; Morris 1998: 108; Whitley 1991b: 345), but its emergence is defined by several key characteristics, some shared with other kinds of state form, some unusual and specific (Thomas 1981; Snodgrass 1991, 1993; Morris 1991, 1998; Hansen 1993; Raflaub 1993). An overtly consensual sociopolitical system/ideology is universally characteristic. So is the concentration of population in large (not initially urbanised) settlements, identified closely with their independent political territories. This development is associated with the appropriation of land as a privately ownable asset (Finley 1973; Thomas 1981: 47-8; Rich and Wallace-Hadrill 1991; Descat 1995). Various cultural elements seem to have been integral to, rather than simply instruments of, *polis* development. These are the increasing deposition of wealth in public (sanctuary) contexts, rather than its personal competitive consumption (Snodgrass 1980a: 52-63; Morris 1987: 89-92; Sourvinou-Inwood 1993; Morgan 1993; de Polignac 1995), and the rise of literacy, the use of which seems in

<sup>1</sup> The combination of archaeological and textual evidence, as well as cross-regional comparison, are common in treatments of the Aegean EIA (e.g. Snodgrass 1991b; Shanks 1996; Morris 1998; Morris 2000).

some areas (Crete among them) to have been a form of authority/identity assertion in and by the emergent polities (Whitley and Stoddart 1988; Whitley 1997; Morris 1998: 100). The development of a very strong ethnic/historical consciousness is seen both in burial/cult practice and in textual references (Coldstream 1976; e.g. Qviller 1981: 143-4; Bérard 1982; Snodgrass 1982b; Whitley 1988; Antonaccio 1995; Hall 1997; Morris 2000: 218-38; 267-73).

Morris identifies two broad regionally- and diachronically-oscillating forms of the *polis*, whose development is divergent from at least 900 BC. Crete (among other regions) is contrasted with Athens in this model (Morris 1998: 100-1). Further descriptive and comparative analysis of these regionally-variant trajectories towards the state in the Aegean still needs to be undertaken; the analysis of post-PG socioeconomic change in Crete can contribute to understanding of why the ‘agro-literate’ form of the *polis* that Morris identifies, rather than the Athenian-type ‘citizen-state’ model, developed there. However, the more general theme of my discussion in this chapter is why and how Crete made the basic transition from non-state to state society. It is apparent that the character of 8th-century and later *polis* structures in all areas of the Aegean must relate in many ways to pre-existing circumstances, and this relationship is (in view of my study’s interests) the focus of the following discussion. There are a number of potentially determining elements to be considered in explaining the character of the *polis* with reference back to the EIA. Bennet suggests for the emergent Cretan *poleis* that

‘In an island with such a fragmented topography, the emergence of small independent polities is not surprising and may well present some parallels with the prior emergence of states in the Bronze Age, although there is a major difference in scale’. (Bennet 1990: 202).

In this view, *polis* formation in Crete is negatively-determined, with the main positive determining factors seen as topography and large-scale process. Sociopolitical and settlement organisation revert to a ‘dispersed units’ template in the absence of external political control from the beginning of the EIA period. For the Greek mainland, too, the argument has been made that topography helped define the physical limits of the *polis* (Thomas 1981: 44).

Regarding its structure, other views have focused on EIA social developments as both creative and bounding factors. Garnsey and Morris combine a model of subsistence management - a risk-buffering function - with acknowledgement of the high importance of specific structural elements in producing the *polis* form (Garnsey and Morris 1989: 101). For Morris, a post-LBA power vacuum, coupled with the ‘unique ideology’ of a broad-based elite which emerged by c. 1000 in central Greece and adapted its ideological power base in response to rising access to imported value goods from the early 9th century, is crucial (Morris 1998: 104). Snodgrass has

stressed the role of peer polity-type interaction and of diffusion in giving rise to the *polis* form (Snodgrass 1986).

These few analyses, and many others, consciously use a very generalised model of the *polis* to carry on the discussion, acknowledging the limitations of such a model in view of clear regional differences and ongoing change in the form (Garnsey and Morris 1989: 98-100). Here, I take the opportunity to investigate various creative and bounding factors behind *polis* emergence in a specific regional context.

#### *The Cretan polis form - general characteristics*

Snodgrass's definition of the Greek *polis* is as 'a polity consisting of a settlement and its territory, politically united with one another, and independent of other polities.' (Snodgrass 1986: 47). Strong unifying identities for the Cretan nucleations and their hinterlands (often linked to LM IIIC-SM regional collective identities) were probably consolidated during or soon after the 10th century (see below). The use of a congruent identity for the pre-eminent settlement and its whole political territory continued even after very large-scale C-H expansions, which involved the takeover of whole *poleis* and their territories by others (Thomas 1981: 46-7; Hansen 1993: 8; Hayden 1995: 93-4; Perlman 1996). Morris puts Cretan *poleis* on the 'state' end of the scale of 'cityness' or 'stateness', on the basis of their type of political organisation (Morris 1998), and this seems accurate in a spatial sense, too..

The 5th-century Gortyn law code describes a social and economic system of which many elements may go back to Archaic and earlier (Willetts 1967; 1965: 56-119; 1977: 216-44). Private landholding is seen to have been important to the economy. Serfdom and the *syssitia* (the common meal for the citizen elite) formally mobilised agricultural produce, but tightly-defined lineage relations strongly determined the movement of all kinds of wealth. Political, as well as economic, power was substantially vested in lineage segments, with the practice of appointing the ruling council of *kosmoi* from specific clans is indicated by the Dreros inscription to have existed by the late 7th century BC (Willetts 1955: 181-5). Morris highlights greater social mobility - less rigidity of the horizontal dividing line between citizen and serf or peasant - in the Cretan 'type' of *polis* than in the Athenian one, with a smaller, more powerful stratified elite, but with stronger cross-cutting lineage links. 'Ethnic' attributes and foundation/origin myths were firmly attached to the Cretan *poleis* from at least the Archaic period, seen most clearly in the self-proclaimed Eteocretan identities of 7th- and 6th-century *poleis* in east Crete (Duhoux 1982; Whitley 1997, Hall 1997: 177-9; see discussion below). These must have provided important legitimative and creative structures for emergent polities.



Although I have stressed the importance of lineage/region-based institutions in promoting social stability already in the EIA, these are likely to have been vulnerable in the context of larger community sizes and increasing complexity, and to have undergone adaptation between the 12th and 7th centuries. The strengthening of collective identity structures was one form of change; another must have been the development of the consensual type of ideology, linked to some real broadening of the political power base. However, the fact that a fairly narrow group retained substantial economic power in the Cretan *polis* suggests that a smoother transition to state structures (i.e. less radical destabilisation) may have occurred here than elsewhere. As a result, the elite of the Classical *polis* seems to have mapped more closely onto the state entity (Willetts 1955: 105). Small's identification of conflict between the economic interests of elite and state in the A-C Aegean may not apply to Crete, as he himself notes (Small 1998a: 283).<sup>2</sup> As long-distance, large-scale exchange involving the island increased through the 5th century and later, we have evidence that it was regulated by states to the benefit of the social whole: at the same time, though, elite interests can still be seen to be protected, e.g. in the *isopoliteia* agreements<sup>3</sup> (Guizzi 1999; Viviers 1999).

I have already noted the early importance of depersonalised cult activity in both intra- and extra-settlement forms, and the further growth of both in the PG-A period. As elsewhere, this had the effect of deflecting/adapting elite competition. By G-A, temples within settlements had become considerably more elaborate than those of LM IIIC-PG, and served a greatly enlarged community (including, perhaps, smaller settlements in the territory of the *polis*). Examples of this development are seen at Dreros, Gortyn and Prinias. Some cult use of the same location was established by the 10th century in the last two cases, although they can be recognised as formal temples only from the 7th century (the 8th century at Dreros). See Pernier 1914, 1934; Marinatos 1936; Rizza and Scrinari 1968; Willetts 1977: 191-2; Mazarakis 1997: 224-6; Watrous 1998. At Praisos, the sanctuary on the Third Acropolis dates to at least the 7th century. The cult area/building at Arkades (used from the 9th century) has a similar level of votive deposition by the same period (Lebessi 1969, 1970). At Knossos and Phaistos, we also see the elaboration of separate temple areas within the settlement by G-O (Coldstream 1973; d'Agata 1998; Cucuzza 1998).

<sup>2</sup> *Contra* Small's view, Morgan 1993:27; Garnsey and Morris 1989: 103 suggest a generally large amount of flexibility and overlap in the economic interests of elite and state in 6th- and 5th-century Greece.

<sup>3</sup> These agreements promoted reciprocal trading, access, defence and taxation rights/obligations between *poleis*, effectively giving elements of citizenship of one *polis* to the inhabitants of another.



The Cretan *polis*, like other *polis* forms, seems to have comprised a flexible kind of political ‘false consciousness’ (Ehrenberg 1948: 158-9, see also Ober 1989: 55-7; Morris 1998: 96; 2000). But as a social/cultural practice, a living and changing system, it clearly had a dynamism beyond that of a structural form alone. Below, I isolate several areas of economic and sociopolitical development integral to the emergence of the Cretan *polis*, trying to relate them to each other and to explore the role of settlement and of other cultural elements in producing them.

#### *The importance of settlement*

Schallin observes that earliest significance of the *polis* lies in its embodiment of social institutions/identities, rather than a specialised economic function (Schallin 1997: 23). The nucleation pattern of the 10th century in Crete seems related to the development of new authority forms based on larger community units, rather than economic centralisation and functional specialisation (which both developed later, as the nucleations grew and small satellite settlements became established). The nucleation process itself must have helped produce these later developments, but also suggests that the rise of sociopolitical/economic complexity was already underway by the 10th century.

The persistence of highly-defensible ‘citadel’ sites into the G/A periods (outlined in the previous chapter) is interesting in the light of the above argument. For me, the idea that these sites represented groups actively resistant to domination by the nucleated polities is less than convincing.<sup>4</sup> Rather, they support the concept I discussed above, that the *polis* in Crete was never *only* a nucleated settlement and its producing hinterland, but a cohesive identity, representing spatially disparate groups. The sites do not look as if their only function is as forts or watchpoints, either; they have evidence for full-time occupation and a full range of settlement activity, including burials, into the LG period. It may be that they were associated with particular segments of society - lineages with strong roots in one area, who combined membership of an emergent *polis* nucleation with a physical foothold in their ‘own’ territory, at the same time providing the main settlement with a defensive outpost. The sites’ highly defensible qualities, in conjunction with their lack of growth over time, are the main pointers to this special kind of status. It is the constraint on growth which suggests lack of political

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<sup>4</sup> As I will make clear later in this chapter, I do not see conflict as the main mode of settlement development in the PG-A period. Even if it were, the sites’ defensible qualities on their own are unlikely to have enabled small groups to survive politically and economically if surrounded by hostile territories, controlled by the large nucleations.

independence. Defence was clearly still relevant, as a result of the large number of competing/expanding polities in the island. Snodgrass suggests that the defensible sites' survival also relates to an element of threat from outside, lasting into the G period: 'Kavousi and Vrokastro in eastern Crete look more like tactically-sited hilltop refuge sites than the centres of populated territories....The mere fact that these fortifications<sup>5</sup> are mainly confined to island sites, at a time when mainland and offshore-island settlements...were unfortified, suggests that some special geographical factor, rather than a ubiquitous political change, was responsible' (Snodgrass 1991:8).

He refers to

'the other almost invariable feature of these fortified island sites: their lasting abandonment, usually in the years around 700 BC. It is, I think, this negative feature which gives the strongest hint of political change. What concerted process, if not state-formation, would lead to the roughly simultaneous desertion of a range of sites which for the previous century or two had been not merely occupied, but in some cases places of real local importance [e.g. Zagora, Emborio and Lefkandi]?' (Snodgrass 1991: 9).

In Crete, the contrast in the use of sites with defensible qualities before and after c. 700 BC is not quite so stark as Snodgrass suggests. Many of the main *polis* sites were intrinsically quite defensible and continued to be occupied from LM IIIC right through the C/H periods, while some of the small highly-defensible sites continued to be used until Archaic. In east Crete, the nucleation phenomenon occurred as elsewhere, but did not stop a relatively high number of small defensible sites from flourishing. I suggested in the last chapter that this may have resulted from the fact that so many small political territories/strong regional identities existed from LM IIIC in this part of the island (this differs from suggesting that the small PG-A groups were actively resistant to the larger communities/without any political links to them). But the explanation proffered by Snodgrass does have a strong general application to the Cretan case: by the 7th-6th century the whole outlook on defence had changed, undoubtedly thanks to new kinds of political structures. The pattern of A-C settlement shows almost no use for dispersed highly-defensible sites and there is an expansion of rural residence, as well as movement towards the coasts. Maintenance of security/political allegiances within the wider hinterland of the *polis* was increasingly possible without either the physical co-location of its constituent social groups or the maintenance of defensible outposts.

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<sup>5</sup>He is referring to this type of site in general, not just the Cretan examples, which are unfortified (although see Hayden 1988, Hayden forthcoming for a defensive wall at Elias to Nisi on the peninsula north of Vrokastro). The Cretan sites are, as we have seen, extremely naturally defensible.

It is clear from the above discussion that changes in settlement relationships were an important creative force in state emergence. Collaborative political and economic interaction was encouraged by the nucleation process; expanded territories were linked to political cores through small dispersed settlement, and in some cases delimited or protected by the continued use of defensible 'citadels'. I see the latter case as an intermediate phase in territorial expansion before the *polis* as an institution became strong enough to fully politically incorporate an extended area.

#### *Landholding and the new settlement pattern*

Somewhere in the EIA, land became an ownable asset. Serfdom's rise must have been closely linked to this development, probably through a process of indebtedness, where groups who could not meet their obligations to others experienced the gradual appropriation of their subsistence hinterland. As a structural form, serfdom may directly have facilitated the constant expansion of *polis* territories through the A-H periods: when land was controlled in a decentralised way, with some feelings of attachment to the land on the part of those who worked it, fewer frictions were likely to arise from changes in large-scale political control.<sup>6</sup>

In LM IIIC-SM, I have argued that small and overlapping subsistence hinterlands, sometimes with considerable disparity in size and arable value, must have encouraged significant inter-community cooperation (whether in tight settlement clusters or between rather more widely-spaced groups). The social framework for cooperation is likely to have been obligations/allegiances based on lineage or on very locally-based community structures. Initial moves to define 'ownership' of pieces of territory would clearly require changes in such allegiance systems. Several changes may have occurred together as early as the 10th century. From this time, the size of agricultural territories almost certainly expanded (since easier access to large arable areas was obviously important to the PG-A communities, as shown in the previous chapter). The control of a larger land area from a single nucleation would require the coalition of a greater number of existing local groups (or their subjugation to a single powerful one) and the consolidation of each group's power may have started to take the form of land holdings (Snodgrass 1993: 37). This same, stabilised kind of power-sharing is likely to have been integral to the formation of the nucleated communities themselves (Qviller 1980: 116-7; Morris 1989: 513; Donlan and Thomas 1993: 66-7). The increased investment encouraged by formal land ownership and larger exploited territories would produce greater subsistence

<sup>6</sup> Serfdom seems to have been characteristic of the more 'territorial' type of *polis* state elsewhere, too. (Thomas 1981: 49-50; Morris 1998).

surpluses. This could eventually lead to the appropriation of significant economic power by particular groups/individuals, fragmenting the coalitions and even indebting some groups within them. Yet secure land ownership could only be maintained in the context of the new political power-sharing institutions. Thus these two elements supported, but also constrained each other. If I am right in giving an early initial date to both developments in Crete by seeing them as intrinsically linked to settlement nucleation, one of Snodgrass's generalisations must be inaccurate for this region:

'the idea that any part of the inhabited space must belong either to one community or its neighbour must, it seems, have arisen freshly in the course of the eighth century BC in Greece. No such understanding can have prevailed in the preceding period, where communities were seldom close enough for their concerns to abut on each other in this way.' (Snodgrass 1993: 37-8).

Formal landholding was not merely an adjunct of settlement change. It also effectively consolidated status on a plane apart from wealth-goods-based competition.<sup>7</sup> It must have altered this (continuing) form of competition in another sense too - the improved base of subsistence production allowed greater investment in the specialised manufacture of value goods within Crete, and thus partly reduced demand for imports. The effect of the more predictable supply and demand volumes linked to this development would be, again, that competitive consumption of such goods had less potential for social and economic destabilisation.

The Cretan case argues against the notion that only 'classic' territorial state formation involves a role for formal landholding, and that in city-type states, control of labour (on a lineage basis), rather than of land, is the basis of the economy (Stone 1998). Control of labour through allegiances may indeed have been the basis of economic and political power in earlier, negotiated social systems in EIA Crete: formalised landholding replaced this during the PG-C period, but in a small city-state context, where lineage structures continued to be important. This was possible because in Crete (in contrast to the Mesopotamian case) large-scale, institutionalised political infrastructure and ownership was not *required* to make land productive. In the PG-C period, nothing except the proximity of so many other similar groups stopped societies structured around lineage groups and a consensually-framed political system from annexing and exploiting territory in a formal, permanent way. Still the question remains

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<sup>7</sup> The tying of status to formally owned land (with permanent ownership titles held by lineage groups) is a frequently-observed response to an over-volatile competition base (Kipp and Schortman 1989: 378). See Figure 3.2-1.

which is always applied to the Aegean *polis* - why were sociopolitical relations maintained in this consensual form for so long, and how did they develop in the first place?

*Changes in long-distance exchange contacts and volume as a stimulus to complexity*

Crete was one of the areas affected earliest and most strongly by the increased volume of eastern imports from the late 10th/early 9th century. However, I have highlighted some problems with trying to fit the Cretan response to 'typical' secondary state models. Specialised production for export does not appear to have been stimulated by increased contacts/imports, as such models predict. Neither, although they are often the precursors of secondary state development, do social or physical mechanisms of control over access to imports and exotic-type value goods appear to have operated in Cretan EIA society (Kipp and Schortman 1989; see Chapters 3.2 and 3.3 above).

Consensual political structures, the establishment of lineage/regionally-based identities (strengthened in the course of settlement nucleation and through landholding), and the developing emphasis on wealth deposition at public sanctuaries all helped to divert or stabilise forms of competition based on value good acquisition. The growth in the local production of value goods, and the continuing, socially unrestricted consumption of these items (Crete's particular forms of response to the increased import flow) could only have occurred in the kind of complex, stable socioeconomic context created by these various institutions. However, another kind of instability, arising from the contemporary expansion of political territories throughout the island and the eventual emergence of sustained inter-polity conflict, may have restricted ability to make large-scale investments in export production. The emphasis on consumption of locally-produced value items may even reflect deliberate attempts to further stabilise wealth and status relationships, by discouraging escalation of interaction with the outside world in the volatile sphere of value goods. Overall, though, developing social complexity/institutionalisation in Crete was minimally harmful to engagement with foreign exchange.<sup>8</sup> While a rise in external contacts and in physical access to value goods *did* generally stimulate the growth of state-type institutions as an adaptive response, this was a different and much less disruptive process than in other areas of the Aegean.

*Ethnicity and the construction of collective identity*

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<sup>8</sup> This perhaps foreshadows the close relationship between elite and state interests in foreign trade in the Classical *poleis* of Crete.



Recent analyses have highlighted the importance of ethnic associations in constructing EIA-C social and political relations. Migration myths and regional genealogies are prominent in texts from Homer onwards (Hall 1997; Morris 2000: 198-201). The role of earlier orally-transmitted traditions about ethnic origins is likely to have been enhanced by their crystallisation in writing. We see them applied to Crete in the famous reference to the ethnic foundations of various Cretan polities in *Odyssey* 19. 172-7 (Sherratt 1996: 90). The high density of textually-identified ethnic groups in Crete makes it important to study ethnicity's role in sociopolitical structures. The references have often been used by scholars dealing with archaeological evidence to argue that migration into the island was a major factor in cultural change (see Chapter 3.3). But as I shall discuss, Hall's comment seems particularly apposite for Crete: 'myths of ethnic origin...have often been taken to be the remnants of a genuine historical memory of migrations at the end of the Bronze Age, though I suggest that they are better viewed as the means by which ethnic communities 'thought themselves' in the historical period.' (Hall 1997: 2)

Hero and tomb cults in 8th-century mainland Greece, along with other cultural references to antiquity and ancestry seen in the earlier part of the EIA, have been regularly analysed from a perspective of status/identity construction (see above). For Crete, it seems quite useful to discuss various forms/scales of culturally-constructed identity together. For example, I think it particularly difficult to distinguish between the structural implications of practices such as the continued use of LM IIIA-B cemeteries into LM IIIC-SM, the long-term use of cemeteries and graves within the EIA period, the re-use of settlements as burial places, and elements of continuity in settlement location and development, undoubtedly related to the emergence of strong regional community identity (all already discussed here). Particular elements of cemetery use at EIA Knossos have been isolated as relating to (ethnically- or historically-referent) identity assertion - the founding of the North Cemetery in a different area from other LM IIIC-SM burials,<sup>9</sup> and the late 9th-century (PGB) re-use of LBA larnakes/tombs (Coldstream 1994: 109; 113-5; Coldstream and Catling 1996: 715; 718-9). While both may indeed relate to the deliberate differentiation of a particular group, they do not seem distinctive in this respect from other concerns with the ancestral past seen in mortuary practices at EIA Knossos, such as the re-use of LM I tombs at Ayios Ioannis and the Kefala hill in LM IIIC-SM (see Chapter 3.2), the emphasis (particularly from the 10th/9th century onwards) on collective interment in tombs used continuously over several centuries (Whitley 1986: 275-7), and the very intensive use of the North Cemetery area, including periodic re-use

<sup>9</sup> See the comments on this in Chapter 3.3.

of individual tombs, into the O period. All the practices mentioned, which obviously incorporate different degrees of exclusivity, involve reference to a perpetuated framework of place as well as of ancestry: the combination must have produced strong social bonds, as I have previously noted (Chapter 3.2; see Morris 2000: 258-306).

The boundaries between such practices and reference to emergent wider group identities of an 'ethnic' type seem very fluid. Assertions of *polis* identity/ethnicity share the appeal to ancestry (Thomas 1981: 44-5; Hall 1997: 137-42). Some broad distinctions between types of interest in manipulation of the past can still be made, however. In central Greece in the 10th century and later, Morris notes that the ancestral past and exotic, rather than local, ties were associated with elite status (Morris 2000: 128-9; 178-85). On another (local) plane, spatial continuity with the past through settlement, sanctuary and tomb use could be inclusive, helping to displace intra-societal conflict/competition (Winter 1995: 260-1, Morris 2000: 195-256). A sense of identity with the local past in settlement and references to ancestry/antiquity in mortuary ritual *both* seem to have been established early in the EIA in Crete, the latter certainly being used (at least in LM IIIC-SM) to assert elite status - e.g. the high-value heirlooms in the SM tombs at Knossos. From the 10th century, various kinds of cultural reference to the past appear to have worked more often in an accessible, inclusive way, consolidating either lineage or wider group membership. At the level of community-based ties, reference was not to LBA spatial forms (as seen in the spatial integration of tomb and hero cults with the rise of the *polis* in Attica and the Argolid: cf. Whitley 1988), but to the recent, LM IIIC-PG past - e.g. the reuse of the Vronda settlement as an LG cemetery, or the strong regional continuity in PG-A settlement systems, both discussed in the previous chapters.

In mainland Greece, some kinds of cultural references to the past have been argued to represent the opposition of elite groups to emerging state/collective identities (Whitley 1988: 181; Antonaccio 1995: 257, Morris 2000: 272-3, Winter 1995: 260-1). In Crete, assertions of identity seem to have overlapped more smoothly from the sphere of individuals or small groups to that of large communities, perhaps, as I have already suggested, finding earlier stability at the level of the lineage/extended-lineage community group. A context of well-established stable collective identities from the EIA may explain the lack of obvious tension between an elite and an oppositional 'middling' ideology in the Cretan *polis*.<sup>10</sup> Ironically, the *protection* of opportunities for individual assertion (through the consumption of value goods) offered by the

<sup>10</sup> Morris observes that this kind of tension prevailed in many central Aegean societies into the C period (Morris 1997: 11-12).

early institutionalised context may have allowed Cretan society to develop towards the small stratified-elite-, rather than the more inclusive 'citizen' type of state.

The question is still open of when full-scale ethnopolitical identities were formally taken on by the nucleated communities, and the degree of negotiability of these identities in the territorial realignments of the PG-A period, but we know that they were well-established by the time of the 7th-6th century Eteocretan inscriptions - and probably before, as the *Odyssey* reference shows (Bosanquet 1910; Duhoux 1982; Whitley 1997, 1998a). The degree of cultural difference between the closely-packed Cretan communities in PG-A seems actually to have been rather small, and 'ethnic' distinctions were enhanced through a few very specialised elements of cultural practice.<sup>11</sup> But together with the rise of landholding, these identities allowed the appropriation of power within and between communities, in a way which the previously-existing systems of competitive acquisition of value goods could not (Hall 1997: 27-9). In contrast to the view of 'ethnic' identities as socially constructed and constructing, analyses which take the foundation/origin myths at pretty much their face value have been made for Crete. They imply that after migrations in the 12th to 11th centuries, various 'original' ethnic groups then kept their boundaries intact throughout the EIA (Demargne 1947: 93-98; Willetts 1955: 250-4; Desborough 1964:178-9; 192-5; 217-57; Catling 1996c: 646; Coldstream and Catling 1996: 715). Although this notion can be attractive to superficially explain things like the complex use of burial ritual, for example, it cannot be clearly supported by any aspect of contemporary material culture. Instead, sources like Homer and Strabo (Book X) reflecting a prevailing concern to identify and explain the ethnic origins of the Cretan *poleis*, show ethnic consciousness as of great *political* importance. The large number of nucleated polities emerging in the EIA together with the early development of an large number of ethnically related origin myths in association with them, suggests the strong relationship between conscious ethnic/collective identity and political survival. This is not to take an instrumentalist view of ethnic consciousness. Political alliances/obligations contracted in terms of ethnic links had serious consequences in terms of warfare. Membership of a particular *polis* controlled all of a citizen's economic activities by C-H. The use of the Eteocretan language alongside Greek text in legal inscriptions simultaneously legitimised their content and

<sup>11</sup> In Classical Greece the term *ethnos* is used to refer to a fully distinct nation-type state (Morris 1987:6, 1998; Hansen 1993: 20; Hall 1997: 34-6); here I am mostly talking about more subtle distinctions in identity between emergent *poleis*. Still, the Eteocretan concept, for example, is strong enough to be referred to as a consciously 'ethnic' grouping. Such distinctions developed within a context of supravening Greek identity, a point to which I return below.

reinforced a consciously 'ethnic' collective identity which had considerable political power (Hall 1997: 170-79).

Yoffee notes that a common (and expansion-limiting) characteristic of city-states is that they see themselves as part of a wider collective/ethnic group, ultimately connected by genealogy (Yoffee 1998: 258-9). This applies well to the Aegean case. Hall suggests that the 'sociocultural paradigm' of a broad 'Greek' identity was 'a way of coming to terms with new conceptions of space and territoriality as populations became more sedentary towards the end of the eighth century' (Hall 1997: 45; Morris 2000: 257-61). This development was reflected and produced by various cultural forms. Morgan describes the 8th-century growth of sanctuaries used by a number of *poleis* as promoting a consciously wide, Hellenic identification (Morgan 1993). In a similar vein, Nagy shows how epic poetry diffusion helped to produce and was promoted by the rising pan-Hellenic consciousness (Nagy 1996: 38-43). It has been observed that the definition of 'Greek' identity within the epic texts is in large part against a symbolic 'other', personified in the Near Eastern/Phoenician trader/adventurer, with characteristics of greed and cunning presented as antithetic to Greek heroic virtues (Winter 1995; Sherratt 1996). Sherratt points out that the roots of an anti-eastern, defensive definition of a Greek collectivity may lie in the recurrent economic instability linked to circulation of value materials/goods of east Mediterranean origin, and notes the ambiguous presentation of Crete in this polarised context (Sherratt 1994: 81-5; Morris 2000: 228-34). A relation of some tension must have continued throughout the EIA between the growing solidity of the island's links with Greek ethnicity through the *polis* form, and the social/geographical accessibility of identification with an exotic-goods-linked status system.<sup>12</sup> The kind of highly-formalised articulation with the east reflected by the Phoenicianising cult installation at 8th-century Kommos seems further to illustrate Crete's special position, in a context where important sanctuaries elsewhere in the Aegean were promoting the growth of the pan-Hellenic identity, as well as providing a physical and political intervention in interregional trade on behalf of emergent *poleis* (Morgan 1993; Sherratt and Sherratt 1993: 367; Morgan 1986: 191-235). The Kommos temple is sometimes regarded as a direct, isolated extension of Phoenician culture into the Aegean, rather than a locally-developed cultural medium for long-distance interaction (e.g. Sherratt and Sherratt 1993: 367). But it could clearly have incorporated many of the same intra-societal unifying/buffering elements as the other Aegean sanctuaries, and seems mainly

<sup>12</sup> As I have suggested, the increased manufacture and consumption of 'exotic' products in Crete by the 9th century may have been deeply integrated with a need for self-definition/social stability in this context.

different in the more frequent and direct interaction with easterners which it facilitated. Because of this it could less easily reinforce the pan-Hellenic concept.

The socially cohesive properties of lineage systems, regional/community identity and larger scale ethnicity are all apparent in Crete at this period, and their operation seems to have been on a kind of 'sliding scale' (see the discussion at the end of Chapter 3.2). I try to represent this in a diagram which refers to the spatial/settlement relationships already discussed here and by Haggis (1993) for EIA Crete (**Figure 4.2-1**). A similar idea of overlapping identities is expressed by Morris (2000: 272-3) as a 'spectrum of values', which cultural forms could be used to reinforce in both exclusive and inclusive ways. The transitions and overlaps occurring within this spectrum, in the case of Cretan society, appear to have been exceptionally smooth.

#### *The nature of sociopolitical change - relevance of intra-societal conflict*

A question arising from all the discussion in this chapter is the degree to which elite-led (managerial/ aggrandising) action, as opposed to intra-societal conflict and upheaval, changed sociopolitical systems in Crete (Raaflaub 1993: 74-5). Morris seems recently to have partly revised his reconstruction of political developments in EIA Athens/central Greece, preferring to avoid the term revolution, and gives not a top-down, but a less dramatic interpretation of the emergence of consensual structures:

'I suggest...that those aristocrats who adopted the middling position deliberately assimilated themselves to the values of ordinary citizens...they claimed leadership as special members of the polis, not as a distinct aristocratic community of the kind which the elitist tradition created. Middling aristocrats did not struggle across the seventh and sixth centuries to create democracy. But the unintended consequence of their beliefs was that when the elitist ideology collapsed after 525, the general acceptance of middling values made democracy a real possibility.' (Morris 2000: 163).

However, he suggests that recurrent social tensions were never fully resolved, either by the 'middling'/consensual ideology or by any other form of top-down institutionalisation/control. In Crete, I have suggested that the steady growth of nucleated communities in the 10th century onwards was greatly facilitated by cooperation between powerful groups, and indeed brought about by the perceived benefits of cooperation. How far might bottom-up pressure also have come to bear on these developments? Long-distance commodity circulation had affected aspiring elites, as well as elites, in the Aegean from the 12th century: the consistently wide access to value goods which we see in EIA Crete shows that a big group was active within the same sphere of social and economic transactions. The size of the group (despite its early



control by institutions like lineage and wider community identity) must have meant that changes in the power base always had to be widely negotiated and accepted in order to be maintained. Snodgrass points out that early adaptations in social structures may have helped limit bottom-up instability in some EIA communities, and I believe this to have been the case in Crete (Snodgrass 1993: 36). Yet despite the degree of institutionalisation I have already discussed, and the fact that several levels of social stratification were well-enshrined by the 5th century, serfdom (not slavery) was the norm in the Cretan *polis*, and serfs held a fairly mobile socioeconomic status<sup>13</sup> showing how flexible the social system must have continued to be. Was this flexibility 'allowed' by the elite as a stabilising form, to help prevent large-scale social unrest, or did it represent the regular vulnerability of the society to bottom-up pressure? Both are probably true. The gradual and non-dramatic nature of social change suggests it took place in a controlled context. However, the problems for Cretan elites if social structures had not been increasingly institutionalised over time might have been significant: it was in their interests to adapt.

The process of settlement nucleation and the emergence of landholding must have depended very much on how direct elite associations were with existing community identities. If they were strong, a few elite groups could successfully mesh territories and power bases, with the inevitable marginalisation of weaker groups peacefully rationalised by a form of coalition (couched in terms of regional collectivity/polity membership). If elite associations to wider community structures were weak, however, territorial expansion and integration would prove more difficult, and groups might regularly branch off or resist incorporation in larger social systems. While inter-elite alliances on their own could not prevent intra-societal conflict in such potentially volatile circumstances, broader institutions of collective identity could do so fairly successfully.

Mazarakis-Ainian raises the question of whether the growth in use of 'public' sanctuaries at this period represents the conscious institutionalisation of social relations by an established controlling group, or competing-/aspiring-elite reaction against increasing institutionalisation.<sup>14</sup> In Crete, the establishment and steadily-developing importance of separate public sanctuaries from the 12th century onward argues against the latter interpretation. As on the mainland, though, extra-settlement sanctuary use may have been a

<sup>13</sup> With the accumulation of rights to land they worked on over long periods, and in some cases the right to inherit land (seen in the Gortyn law code).

<sup>14</sup> This question is placed in the context of a wider discussion of oppositional elite control over other forms of cult practice (tomb and hero cults); see Mazarakis-Ainian 1997: 356-7; 376-7; 395-6).

form of continuous negotiation between different groups over the control of territories (Morris 1987; 190; 2000: 273-80; Morgan 1993; de Polignac 1995: 9). Initially (in LM IIIC-PG) this collaboration would have been between smaller communities. As social complexity developed and political units became larger, the use of sanctuaries must have been renegotiated between larger groups, but also, perhaps, by groups within them (e.g. in terms of competition in votive deposition). Overall, though, the steady growth in public cult seems to represent part of a seamless development, through practice, from smaller to larger collective identities/institutions, rather than social conflict.

By the C period, the economic power of the Cretan elite was entrenched in various ways, making any radical disturbance of it during the EIA unlikely. In the 10th and 9th-centuries, craft specialisation seems likely still to have been strongly attached to elite investment, and really large-scale, market-based specialisation of production is not evidenced during the whole period of state emergence (Morris 1991: 38). Since general economic growth was encouraging social mobility by constantly broadening physical access to value good consumption, elites had an increasing interest in other, more stable bases of aggrandisement. One of these may have been the bulk production and exchange of subsistence goods, apparently strongly elite-controlled by the C period (Gamsey and Morris 1989: 100; Small 1998a). However, consistently high surpluses would be required for heavy investment in the production and exchange of subsistence items. The growth of landholding would help increase surplus production, but also placed firmer limits on the surplus obtainable by any single group. Bulk subsistence exchange would have been a fairly risky activity in the small Cretan polities of the EIA and C periods, but was probably engaged in on a limited scale from Archaic onwards (Viviers 1999).

The early date and steady growth of nucleated communities (and probably of landholding), the perpetuation of kin allegiances, the early importance of regional community identity, the continuing wide access to value goods, and the existence of a limited-size elite/state controlling group in A-C polities, all suggest the absence of dramatic clashes between social groups in the formation of the Cretan states. Yet there is no doubt that as elsewhere in the contemporary Aegean, power relations needed constant renegotiation and that the consensual ideology of the *polis* did represent a real social contract.

#### *The role of inter-community conflict in state emergence*

Given the overlapping set of identity systems which seems to have existed in EIA Crete, examination of intra-societal conflict must be closely connected to that of inter-polity conflict. It is very difficult to identify in which cases groups resistant to incorporation in one polity

could have taken on alternative, spatially-bounded political identities during PG-A. After Archaic, territorial expansion regularly involved the use of warfare at *polis* level (van Effenterre and Bougrat 1969; Willetts 1977: 178-181; 211-6; Perlman 1996). There was undoubtedly already inequality between polities, and thus variable ability/need to expand, during the PG-A period. In central Crete, for example, aggressive expansion and strong polity definition probably started fairly rapidly, given the co-location of numerous early large settlements there. By the Classical period, expansion-orientated inter-state conflict and tension had become longer-lasting, and more threatening to both sides, as states grew larger and more equally-balanced by each other (and began to be supported by alliances with other *poleis*). By the Hellenistic period, direct conflict was being partly averted by *isopoliteia* agreements, effectively an alternative form of economic and political expansion (Perlman 1996; Guizzi 1999; Chaniotis 1999). Strong ethno-political definitions, while tending on the one hand to promote and consolidate unitary status, are likely on the other to have supported and encouraged aggressive interaction (Earle 1989: 85). While the amount of inter-polity conflict shows that strongly-bonded societal units existed, it probably also represents a need for further consolidation in some communities. Earle points up the paradox that too much success in applied conflict leaves an enlarged polity vulnerable to larger-scale attack, as well as to internal social divisions, promoting a cycle of instability and ongoing aggression which seems to apply well to the case of A-H Crete.

If conflict between emergent polities was increasingly important to the development of the Cretan state, was it *intrinsic* to the process of state formation itself? A state formation model exists in which the main dynamic is territorial expansion, after a point of 'economic circumscription' is reached. This occurs when a limited arable territory is maximally exploited. There is unrelieved pressure to produce more surplus, and growing indebtedness on the part of some producers, who cannot splinter off into their own self-sufficient groups because there is no more agricultural land. Enlargement of the resource base then takes place through spatial expansion, involving forceful<sup>15</sup> subjugation of weaker, economically dependent communities by more powerful ones, and the rise of socioeconomic complexity in the newly expanded region (Carneiro 1970, 1981; Earle 1997: 7-9). Earle, in a revision of this kind of view, lays stress on the documented links between circumscription of resources in a loose social/macro-economic sense (not just a subsistence one) and the state-type institutionalisation of power, only *sometimes* through conflict (Earle 1997: 67-105). In PG-A Crete, *initial* settlement nucleation and territory consolidation, which had the effect of formally circumscribing social and

<sup>15</sup>The definition of 'force' can include economic coercion in some cases.

economic resources, may *then* have led to conflict between polities in attempts to retain territorially-based power (a case exemplified in 15th century Peru and 17th-century New Zealand (Earle 1997: 133). The initial unit of aggressive action would thus be rooted in an existing regional/community identity, which was then reinforced through conflict. The slow, attritive nature of consequent expansion seems to derive both from the coexistence in a small area of so many polities, developing under similar conditions, and from the bounded nature of the *polis* form itself (see the discussion below).

The approximately contemporaneous development in PG of such a high number of settlement nucleations, and the element of choice apparent in their locations, are the main arguments against coercive takeover as the main dynamic mode for the early stage of *polis* development. Significant LM IIIC-SM inequalities are not seen between abandoned and continuing PG-A settlements in any region, making simple takeover of weaker by stronger communities inadequate to explain nucleation. Nucleation would anyway be an unfavourable method for the exploitation of conflict-acquired territories, since LM IIIC-SM occupation had been so densely scattered in the landscape. Security and productivity would be better maintained by letting local producers stay on the lands they worked, as in the estate system which accompanied really large (aggressively-expanded) *polis* territories in C-H Crete. Settlement nucleation might help maintain political control, but would leave conquered territory vulnerable: thus the initial nucleation phenomenon is unlikely to have related to conquest alone.<sup>16</sup>

Stone uses the example of second-millennium BC Mesopotamia to argue that warfare takes place between city states only in the context of a wider political hegemony (Stone 1998). Here the expansion of territories by warfare gave rise to communication problems and to fragmentation of a power base grounded in consensual relationships (see also Charlton and Nichols 1998: 8). In C-H Crete, alliances with mainland *poleis* - i.e. incorporation within a broader political unit - did indeed support and stimulate aggression between communities within the island. Their conflicts (and alliances) produced expanded entities which, however, still maintained consensual political systems. This may be connected to the fact that even the largest *polis* territories were always comparatively small, given Crete's limited size. Very strong ethnopolitical identities must also have helped substantially in binding the expanded communities. However, some of the consensual elements which had earlier characterised the

<sup>16</sup> A counter-argument might say that, given the dispersed LM IIIC population, takeover by aggressively expanding polities *would* necessitate the relocation of conquered populations, to prevent split-off or annexation by a competing polity.

*polis* form did decline by the late 5th century: the expanded *poleis* saw the appearance of more elaborate social differentiation and the control of political institutions by a relatively small group.

It may prove helpful to see Crete in the context of diachronic oscillation between *polis* types which Morris suggests (Morris 1998). Potential social instability/excessively-volatile competition there was controlled early in the EIA, by the various social institutions I have discussed. These controls may have been more successful than those elsewhere, preventing the emergence of a full 'citizen'-type state in the 8th-7th centuries. Still, friction between developing communities, the socioeconomic effects of high-volume goods trade, and contact and conscious identification with the rest of the Greek world encouraged the development of many aspects of citizen-state-type structure, including a consensually-framed ideology. Later spatial expansion in a context of maintained sociopolitical stability then encouraged the development of more territorial-/‘agro-literate’-state-type features, and reduced the degree of real consensualism (by the late 5th century).

#### *Conclusions: socioeconomic dynamics contributing to the rise of the state in Crete*

In this chapter we have seen how neither externally-originating nor wholly internal processes are adequate to describe or explain state formation in Crete. The existence of a world-system affecting the whole Aegean has proved a useful one to model both economic and political changes, particularly from the late 10th century, and it is beyond doubt that an important element in PG-A sociopolitical change was the rise of exchange contact with the east Mediterranean. Yet the developing Cretan states were not merchant states, orientated towards the outside world in their economic relations, nor did they come to mirror in structure the Near Eastern societies with which they interacted in exchange. Their emergence related strongly to internal dynamics, in a period after the lifting of physical insecurity allowed formal control of bigger areas of territory to become a crucial element in the political power base. The initial impetus to nucleation from PG, so important to state development, can be explained without recourse to hypotheses of physical intrusion (with settlement being forced into new patterns as a reaction against incoming settlers, or immigrant communities importing their already-shaped social forms into Crete), or of the forceful takeover of weaker by (existing) stronger groups within the island.

Examination of the very specific factors contributing to Cretan *polis* formation highlights the importance of a regional focus. However, we cannot ignore the role of diffusion in creating the *polis*, especially in view of the alliances of Cretan states with those of the Greek mainland by the C period, and the development of foundation/origin myths linking Cretan



polities with groups in mainland Greece. From at least the 8th century, a very high level of contact with other regions where *polis* systems were emerging, particularly Attica, must have resulted in the interchange of structural, as well as material cultural forms (Snodgrass 1986). Within Crete, too, close cultural interaction and parallel development are shown, by the similarity of PG-A developments across the island, to have preceded the emergence of the *polis* form, and must have helped to set its parameters..

I have tried here to elucidate as far as possible the chronology of socioeconomic change in Crete. Morris describes the social trajectory between the end of the Bronze Age and the emergence of the *polis* as follows:

‘a major change in elite structures in the 11th century, a social revolution creating the notion of citizenship in the 8th century, and a further dramatic extension of the principles of citizen equality at the end of the 6th century.’ (Morris 1993: 216).

Identical phases of development are not clearly identifiable in Crete, although socially-orientated studies of large cemetery assemblages like those of Eleutherna or the Knossos North Cemetery may throw more light on details of diachronic social change. Instead, I suggest on the evidence reviewed here that the major shift towards the sociopolitical and economic systems on which the *polis* was founded took place from the early-mid 10th century through the 9th century BC, when settlement pattern data and artefact records indicate a degree of complexity which had not previously existed. Many consequent changes in all spheres of life must have occurred before the concrete form of the Cretan *polis* emerged by the 8th/7th century, but the late 10th/9th century is a very important turning point.

Classic historical questions about the priority of various events, processes and human motivations have arisen throughout the foregoing discussion (Gledhill and Rowlands 1987; Shanks and Tilley 1987: 58-9; 185; Trigger 1998: 179). My analysis highlights the particularity of sociopolitical change, and the role of cultural action in changing social structure. It appears extremely difficult to separate, or assign chronological priority to, different forms of power appropriation in this period and area (in contrast to some of Earle’s approaches in studying the rise of social complexity; cf. Earle 1997). Did friction between already-nucleated communities engaged in expanding their territories, promote the emergence of defined rights to land, and thus facilitate further territorial expansion? Or did a growing focus on the control of land (as replacing/diverting personal competition based on prestige good consumption) stimulate a move to larger settlement nucleations which could better control expanded territories through new political structures? If the impetus towards landholding grew out of inadequacies/fragility in the existing systems of power relations, how far were the latter undermined by external factors, which increased the opportunities for wealth-goods-based

competition? How far did the changed economic base, by increasing social complexity and the ability to produce large subsistence surpluses, increase the demand for and procurement/production of wealth goods, which in turn promoted the continuation of this kind of competition? None of these questions are new in addressing the rise of the *polis*, but in Crete the unique clarity and richness of the settlement record stimulates renewed discussion of them and may help to move further toward some answers. Settlement highlights an additional set of considerations relevant to Crete, too - the effects of conflict at various scales, and of response to conflict, on sociopolitical development.

History/ancestry is an important force to be reckoned with in examining all the relationships mentioned above. Emphasis on ethnicity as directing and legitimising collective action, seen in the A-H texts, reference to regionally-based identity in settlement change, regular representation of kinship and ancestral bonds in mortuary ritual, and continuous use of the same public sanctuaries throughout the EIA, all indicate the importance of ancestry- and history-focused *mentalités* in social transformations at this time. These were not merely a superstructural adjunct in sociopolitical change. Collective identity structures must have been directly influential on the rise of various forms of *polis* complexity - consensual ideology, the rise of landholding, settlement nucleation and territorial expansion.

## Part 5

### Conclusions

#### Chapter 5.1

##### Conclusions

In this last chapter, I attempt to draw together many of the general themes of interest to the work with what I have concluded from a detailed study of the evidence. I highlight new questions arising out of these conclusions, and suggest directions for further research. Broadly, the study has illustrated how settlement distribution and relationships throughout the Cretan EIA were affected by a variety of factors, of which subsistence practice was only one; how cultural practice, in the form of settlement, goods production/exchange/consumption activity, and religious and mortuary ritual, changed socioeconomic structure; the relationship of settlement distribution to emergent regional/community identities and the constructive role of these identities in social change, and the long-term effects on Cretan economy and society of relationships with the rest of the Aegean/east Mediterranean region.

The study's methodology is also briefly reviewed, particularly the use of ethnographic and historical data in reconstructing ancient settlement and subsistence systems without the over-direct use of analogy. I consider the value of my field studies in supporting the arguments I have made, and in their own right.

*Focus on 'positive adaptive accommodations' between the LBA and EIA: treating the period on its own terms*

The study aimed to extend interpretative focus away from the causes to the long-term consequences of the cultural discontinuity of c. 1200 BC, as Snodgrass once advised and as other scholars have recently tried to do through both regional and generalising studies (Snodgrass 1987: 187; e.g. Haggis 1993; Foxhall 1995). It tried to avoid reliance on the well-known prior circumstances of the LBA settlement destructions and systemic collapse to predict the consequences of those changes (a somewhat circular approach, criticised by Sherratt 1998: 292). The history behind EIA developments was important to consider, but this was done from a perspective grounded firmly in the EIA evidence. LBA structures and systems did seem likely to have influenced some aspects of EIA society and economy in Crete, including the broad parameters of subsistence practice, the social use and value attributions of some types of prestige goods, and perhaps (particularly initially) some forms of social authority and

organisation, such as the role of the family/extended family. However, these elements of linkage between the LBA and EIA are weak in comparison to the strong roots of PG-A and later developments in changes occurring in LM IIIC-SM period. This is particularly clear with regard to the emergence of various structures of collective identity, which had a strong impact on the course of sociopolitical and economic developments in the island right into Classical times.

### *Subsistence-settlement relationships*

The two parts of the study, one focused on subsistence and one on goods consumption/exchange and sociopolitical relations, were linked through the study of settlement, a rich and sensitive data source for the EIA in Crete. All the elements just mentioned can be seen to have been deeply integrated with each other during the period. In the 12th-10th centuries there appears to have been something of a hierarchy in the relationship between them. Rather than direct determination of the new settlement pattern and social forms by subsistence needs, these were a secondary consideration to defence in settlement location. In contrast, at the time of the second settlement watershed in the early 10th century, the type of settlement selected for continued use suggests a strong concern with expanding physical and political access to subsistence resources. Yet settlement expansion and development from the 10th century onwards was not determined by subsistence base/overall population growth, as van Effenterre would have it (van Effenterre 1991: 204). They determined and were determined by other aspects of developing complexity - the institutionalisation of political power and the rise of new community identity forms - in a closely integrated relationship. Nevertheless, subsistence changes were important within this relationship. Expanded scope and more-formalised relations of subsistence production helped stabilise social competition and promote complexity. They helped achieve the increased subsistence surpluses needed to support investment in local manufacture of value goods, growing from the 9th century onwards.

Results from the field studies were used to assess the role of various environmentally-related considerations (subsistence potential, communications, defensible topography) in promoting settlement success/longevity in the EIA. They also provided a useful idea of the absolute minimum territories required for subsistence and (together with other archaeological evidence) the likely character of subsistence practices. They highlighted the probable need for regular interaction in the course of subsistence activities between communities with closely-bordering hinterlands (whether this interaction was aggressive or collaborative in nature). Regional, as well as diachronic differences in EIA settlement considerations became apparent.

While its results were crucial to the conclusions of the study, the fieldwork also

fulfilled a subsidiary aim in its own right - to provide stand-alone characterisations of long term settlement and land use patterns in small (12-15 sq km) areas. Within these areas, very detailed description of a set of natural and cultural features was produced, although the aims and method of the fieldwalking meant the standard of recording of archaeological data was less than that of intensive archaeological surveys. The data would form a valuable base component for future intensive survey or detailed settlement studies (never undertaken in five of the six of the case study areas). Unfortunately the resources and scale of the present work did not allow the data to be incorporated in a GIS (Geographical Information System) for future enhancement and use in landscape management and/or research; it is planned to do this at a later stage.

### *Theorisation of settlement*

The effects of the shift at c. 1200 BC were seen to be particularly long-lasting, and to indicate the close, recursive connections of settlement and some aspects of *mentalité* at this time. Often portrayed as belonging to the *longue durée* sphere of change, a mere cultural reflection of historical forces, settlement in this case was shown to be not only a sensitive indicator of structural change<sup>1</sup> (the emergence of collective identity and of complex social and economic forms), but a force for change in itself. On this basis, the 10th-century nucleation phenomenon was recognised as a turning point in state-type institutionalisation in Crete. This view could not have been supported, however, without the use of other types of archaeological evidence.

Attention was paid by the study to identifying functional hierarchy in EIA settlement. For the LM IIIC-PG period, at least, no element of hierarchy was found other than a full descending range of site sizes, although a few specialised-function sites like ports/exchange gateways, cult places, and probable farmhouses/shepherd huts can be identified. On the basis of a consistently-examined range of settlement and mortuary data, it was agreed that there is likely to have been greater social complexity at larger communities (Whitley 1991b). However, there seemed to be no evidence for fundamentally different social systems at different types of settlement, or of oscillation between stable and unstable social systems being directly reflected in settlement. More investigation is still needed to elucidate functional differences in PG-A settlement, apart from the basic ones between very small farmhouses/hamlets and large nucleations.

The relationship of cult places to settlements was also briefly examined for the whole LM IIIC-A period. The early and sustained growth of various kinds of public cult was

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<sup>1</sup> Appreciation of this fact links the work in a general way to Whitley's (1991b) although my conclusions on what settlement tells us about social systems in EIA Crete are different from his.



recognised, and inferences from this used in interpreting the particular course of Crete's sociopolitical development.

#### *Mentalité, culture and social change in the EIA*

The construction of ethnic and other forms of collective identity during the Aegean EIA has been discussed by other scholars. Hall and Morris, for example, have shown how associations emerged between 'ethnic'/place-linked attributes and social status which could be variously exclusive and inclusive (Hall 1997; Morris 2000). In Crete, too, the present study suggested that new identity forms were being constructed throughout the period at several levels. These replaced Bronze Age structures of social cohesion and eventually formed one of the foundations of the *polis*. Winter observes for Aegean societies by the 8th century:

'the displacement of a former code of values and behaviour into particular, rhetorical channels subject to containment, thereby permitting the development of a new code of values and behaviour more appropriate to contemporary social and political developments.' (Winter 1995: 260-1).

In Crete we appear to see early forms of social institutionalisation (of which strong locally-based collective identities were one) which diverted/de-fused the competitive consumption of value goods, allowing it to continue in a stable wider context. Closer physical proximity to the sources of value goods than most other Aegean areas may have been a factor in promoting this early response. One effect was that while in other parts of the Aegean, exotic cultural associations later became perceived as a threat to locally-grounded sociopolitical identities, this was not the case in Crete.

Social change in Crete seems to have taken place more through top-down, structural adaptation than bottom-up pressure. The comparatively smooth process of state formation must have been aided by the early institutions I have just referred to. Although it has been pointed out that the study of the *longue durée* often results in a focus on 'lifeless' institutions or community units, minimising the role of the individual in change,<sup>2</sup> in this case strong collective *mentalités* are not simply better-evidenced archaeologically, but were a crucial, driving element in the course of socioeconomic development (see Bloch 1929 cited in Burguière 1982; Shanks and Tilley 1987: 98; Bintliff 1991: 10-13). Whitley comments for A-C Crete that 'the aristocratic individual obstinately failed to rise' (Whitley 1997: 659): the early collective base was a compromise which actually protected the elite group in the long term.

<sup>2</sup> See Chapter 1.1; Morris 2000: 4-6 for discussion of this issue with regard to EIA-Classical Greece.

Given the element of threat and of concern with defence which manifests itself to changing degrees in the LM IIIC-G archaeological record, and the later textual accounts of regular inter-polity conflict, the present study considered what role aggressive action might have played in constructing the Cretan *polis* during the EIA. I concluded that while conflict was probably instrumental in polity definition from the period of PG settlement nucleation onwards, collaborative mechanisms of various types seem to have played the bigger role in the emergence of the state. Evidence for this is found in the nature of settlement change in PG-A, as well as in the early growth of cohesive social institutions.

*The value of a regional study - identifying special features in development vs. elements of general process*

The focus on Crete was intended to avoid the either very generalising or else Athens-centred character of much analysis of socioeconomic change in the EIA Aegean. It followed recent views that detailed regional studies are essential to better understanding of contingency and process in the history and prehistory of the area (Bintliff 1999; Cherry 1999; Haggis 1993, 1999). The need to consider a recognised major *conjoncture* of this period - between the development of freed-up merchant trade in the east Mediterranean and the social context of prestige item consumption in the Aegean - prevented an overly insular approach. By exploring developments from a regional perspective I hope to have thrown more light on local variability in this relationship's effect on long-term sociopolitical developments.

EIA Crete diverges in several respects from generalised models of socioeconomic change. However, many recognisable elements of process do appear. While not fitting either aggressive-expansion models of state formation or those which predict stability in small city-states, PG-A society exhibits many of the features usually associated with state emergence - increasing social complexity and a degree of stratification, the existence of various forms of political legitimation/cohesion (in particular, historically/regionally-based forms of community identity), the development of large nucleated settlements, and the emergence of landholding. Many of the same factors clearly affected the whole Aegean region through the EIA - the effects of structural collapse c. 1200 BC, giving rise to political insecurity and a concern for defence, and to an initially fragmented instead of centralised, secure basis for social power; access to value imports from the east Mediterranean; the rise of strong notions of collective identity tied up with past and place. The fundamental similarities in the *polis* form which emerged across the region also indicate that some general processes were in operation, including diffusion/peer polity interaction.

A special factor in Crete's case appears to have been the contemporaneous development of numerous relatively small, dispersed but densely-scattered communities from c. 1200 BC. Their parallel growth had the effect of bounding physical expansion early on, focusing strong local identities and quickly giving rise to conflict. Another factor in Crete's difference from other Aegean areas was its proximity to supply sources of value goods. In most world-system models, this position would give it the status of a frontier zone between two levels of the world-system, where value items from the core take on a volatile and disruptive social role because physical access to them is difficult to control (as discussed by Kipp and Schortman 1989; Pyrdyn 1998). Yet the prediction does not fully apply in this case. Instead, the development of stabilising institutions allowed unrestricted consumption to continue. While thanks to these institutions a 'social revolution' based on uncontrolled competition did not occur in Crete, they may have been a restricting factor on investment in manufacture for export, in this again separating Crete's economic development from that of other areas of the Aegean. Their long-term effect was to insulate and promote stratified power relations, eventually producing a special kind of *polis* state.

A process frequently used to explain material culture change at this period is immigration. Discussion of constructed ethnic identity and the various meanings of value goods within a world system proved a useful perspective from which to discuss this. While Hoffman's recent book was extremely useful in re-exploring the artefact record in EIA Crete with the question of immigration in mind, it largely avoided examining value goods in their consumption context, so that the meaning of changes in their production and distribution was incompletely analysed (Hoffman 1997; Hodder 1982a: 204; Gell 1986: 112-3; Cherry 1999: 21). I tried to remedy this. Where it could not be clearly supported archaeologically, I avoided positing the movement of population as the main factor in cultural change, pointing out several areas of the record where this kind of explanation could be re-evaluated through the consideration of broader socioeconomic context. As well as the circulation, consumption and deposition of value goods, these included patterns of settlement distribution, aspects of burial ritual, and ethnic references in ancient texts concerning Crete. However, given the regular cultural contacts between Crete and the east Mediterranean, particularly from the 10th century onwards, it seems likely that people from this region (belonging to various social groups) *were* frequently present in the island. Crete's cultural contacts with other Aegean areas were high and steady from the 12th century onwards, suggesting that permanent movement could have taken place, along with other forms of direct and indirect interaction, but making evidence for immigrant communities almost impossible to differentiate.

*Weaknesses of the present study and suggested future research directions*

My study was inspired by the amount of new archaeological data (particularly on settlement) available for EIA Crete. It is large and diverse enough for other, related studies to be undertaken. Some areas of possible future research seem particularly important in the light of my conclusions. The continuity of many PG and later sites from LM IIIC could be much better substantiated by the detailed study of surface material and/or the excavation of stratified deposits at them, although the latter are not always easy to locate. The EIA cemetery record outside Knossos (including the locations of the cemeteries for some known settlements) remains under-discussed. Lack of detailed analysis often results from a lack of properly recorded and published data. It is hoped this may be remedied in the future, allowing further observations to be made about social systems, particularly in the PG-A period (building on existing commentaries for PG-O Knossos). I was not able to discuss much of the PG-A data within the scope of this study.

Although the inferences to be drawn on EIA society may be limited without more publication and analysis of cemetery material, settlement evidence, as I hope to have shown here, may contribute to filling the some of the gaps. In order to do so, though, it, like mortuary data, must be properly theorised. While important publications on this period in Crete, like that of the North Cemetery and Nowicki's recent book<sup>3</sup>, provide an incredible wealth of detailed data, their descriptive, untheorised approaches need counterbalancing by more studies like those of Haggis 1993 and Whitley 1991a, 1991b.

Aside from the neglect of the PG-A cemetery record, two other major areas of deficiency are apparent in my study. I do not address the Orientalising phenomenon of the 7th century BC in any detail - simply viewing it as a continuance of the socially unrestricted consumption of exotic-type value goods. It has other kinds of social and economic significance which have been previously, and could be further, addressed elsewhere. My last chapter goes over in primitive fashion a lot of ground covered by other works of scholarship on the rise of the *polis*. The wish to contextualise settlement developments in PG-A Crete and to explore their constructive role in social change was the reason for including this chapter, and I am aware of its weaknesses in many respects.

*Studying socioeconomic change - the value of the approach used here*

Because many large-scale and long term factors influenced EIA socioeconomic change, and because settlement (a relatively long-lived cultural form) was an important part of the evidence

<sup>3</sup> Coldstream and Catling 1996; Nowicki 2000.

discussed, a broadly *Annales*-type approach to explanation proved most useful. I formed my questions on the basis of a range of types of archaeological evidence, and tried to use an appropriate diversity and scale of archaeological, historical and ethnographic data in answering them. This was an attempt to balance some recent studies of the period, which have used either mostly settlement or mostly cemetery data, and have either treated Crete as a unit fitting into general Aegean processes or set it aside as a unique, closed arena. I think *Annales* approaches, getting as close as possible to the total history of societies through attention to multiple spatial, chronological and social scales, can still deal best with the perpetual, contingent nature of social change studied through the archaeological record. Recognition of all the complex, overdetermining factors in socioeconomic change, and investigation of its dynamics, rather than just description of it, seem necessary in approaching the somewhat unwieldy, but growing body of archaeological evidence for the period.

Most recent criticism of *Annales* approaches has focused on the limited autonomy of action they assume for groups or individuals. This study showed that contemporary conscious modification of social and economic relationships almost certainly took place in EIA Crete, and found it possible to examine, referring to their own scales of cultural definition/identity, the practices and motivations of variously-sized groups of social actors.



## **Appendix**

### **Methodology of the soil analyses and profile characterisation of selected soils from the case study areas**

#### *Details of the soils analyses carried out in Part 2*

The value and limitations of the types of analyses carried out here are discussed by Russell 1973: 40-3; 65-7; 90-101; 118-21; Haby et al 1990; Lierop 1990: 76-89; Peck and Soltanpour 1990. Some of the same methods were used in Bintliff's and Morris's studies of Cretan soils (Bintliff 1977b; Morris 1994; Morris et al forthcoming), discussed in the text of Chapters 1.4, 2.1, and 2.3. Below is set out the methodology followed here. The work was carried out in the Soil Science Laboratory of the Department of Geography, University of Edinburgh and some results were analysed by the Department of Chemistry, University of Edinburgh.

pH was measured, using an electrometer, of a suspension of 10g of soil in 25ml of distilled water.

Carbonate content was measured using a carbonate 'bomb' where the reagent was 6N HCl used with 0.72g of dry soil.

CEC measurement was carried out by measuring concentrations of K, Ca, Na and Mg in samples of 5g of soil extracted in 125 ml 1M Ammonium acetate. K and Na were measured by flame photometry and Ca and Mg by atomic absorption spectrometry. Results in mg/l were converted to millequivalents.

#### *Profile descriptions - detailed analysis of selected soil samples*

Samples of some of the soil types identified in the fieldwork were analysed by horizon, to assess processes affecting soil development and the amount of variability in physical and chemical characteristics which can occur within a single soil profile. All but one are from the Kritsa area. Results of the chemical analyses are given in the table at the end.

#### Sample D61

##### Anavlochos D6 - Derived *in situ* from phyllite

Sample taken on the N edge of the valley S of the Anavlochos ridge (Grid reference on **Figure 2.2-6**: V/9F/65/23. Altitude: c. 350 m asl).

Ground cover - Olive cultivation/mixed grasses associated with cultivation

See **Plates 56, 57**

HORIZON	THICKNESS	MUNSELL	DESCRIPTION
a	0.2 m	10 YR 5/3	Frequent small angular frags of phyllite, up to 0.1m diameter, in a matrix of sandy silt
b	0.4 m	10 YR 5/4	Immediately above phyllite bedrock. Very frequent small angular frags of phyllite, up to 0.05m diameter, in matrix of sandy silt. Occasional angular frags of quartz and phyllite up to 0.15m diameter

Observations: Very little visible horizonation and little variation in nutrient value. Overall low CEC.

### Sample E31

Kritsa E3 - Derived *in situ* from soft limestone

Sample taken from the mid-slopes below Kritsa Kastello to the east (Grid reference on **Figure 2.2-11**: III/1C/20/75. Altitude: c. 325 m asl).

Ground cover: Excultivated cereal grassland, scattered almonds/olives.

HORIZON	THICKNESS	MUNSELL	DESCRIPTION
a	0.25 m	10 YR 4/2	Sandy silt. Occasional angular cobbles of hard limestone up to 0.08m in diameter lying closest to surface. Occasional small-medium sized frags of soft limestone up to 0.1m diamete.
bla	0.1 m	10 YR 6/2	Sandy silt with very frequent small angular frags of hard limestone up to 0.05m diameter. Occasional small frags of soft limestone up to 0.5 m diameter
b1	0.3 m	10YR 4/2	Sandy silt. Occasional very large angular frags of hard limestone up to 0.25m diameter. Occasional small angular frags of soft limestone up to 0.05m diameter (fewer than in B2)
b2	0.5-0.6m	2.5Y 5/2	Sandy silt. Very frequent small angular frags of soft limestone up to 0.02m diameter. Occasional large angular frags of hard limestone, up to 0.1m diameter
c			<i>In situ</i> weathering products of soft limestone

Observations: pH is lowest in the B2 horizon (although it also drops slightly in the A horizon). This factor and the fact that carbonate content is highest in the B1a and A horizons, while negligible in the lower ones, strongly indicates upward leaching of soil minerals. Salts are concentrated in upper to middle horizons, with calcium, as always, quite high towards bottom of the profile, which is formed from the weathering products of bedrock. CEC is relatively high throughout the profile.

#### Sample E121

Kritsa E12 - Derived *in situ* from phyllite

Sample taken on the northern edge of Kritsa village (Grid reference on **Figure 2.2-11**:

III/5D/40/30. Altitude: c. 300 m asl).

Ground cover: Excultivated cereal grassland.

See **Plate 58**

HORIZON	THICKNESS	MUNSELL	DESCRIPTION
a	0.2 m	10YR 5/2	Sandy silt. Frequent small angular frags of hard limestone up to 0.05m in diameter
b2	0.36 m	10 YR 5/2	Sandy silt. Frequent angular and rounded frags of hard limestone and phyllite up to 0.08m in diameter. Very frequent small angular frags of phyllite up to 0.02 m in diameter
b1	0.5 m	7.5YR 5/2	Sandy silt. Occasional, mostly angular, small frags of hard limestone and frequent small angular frags of phyllite - fewer than in b2.

Observations: pH is similar throughout the profile. There is a significant concentration of carbonates in the A horizon, suggesting upward leaching. The calcium content increases substantially, raising the CEC value, as the soil grades into bedrock.

#### Sample E101

##### Kritsa E10 - Mixed colluvium overlying flysch

Sample taken on the northern edge of the kampos (Grid reference on **Figure 2.2-11:**

III/8C/45/60. Altitude: c. 215 m asl).

Ground cover: olive cultivation

HORIZON	THICKNESS	MUNSELL	DESCRIPTION
a	0.3	7.5YR 5/3	Sandy silt with few cobbles of hard limestone, up to 0.15 m diameter.
b1	0.3 m	7.5YR 5/3	Sandy silt. Very frequent rounded cobbles of hard limestone up to 0.1 m diameter
b2	0.27 m	7.5YR 4/4	Sandy silt. Frequent rounded cobbles of hard limestone up to 0.1m diameter
c	0.3 m	10 YR 5/3	Sandy silt/ very frequent small angular frags of phyllite up to 0.03m diameter with occasional small rounded inclusions of hard limestone up to 0.05m diameter, and

Observations: pH, CEC and carbonate contents are similar (relatively high) throughout the profile. The C horizon has a high CEC because it is nearly entirely formed from the pure weathering products of flysch.

### Sample E481

#### Kritsa E4/E8 - derived from mixed colluvium and coarse river bed deposits

Sample taken near a dry river bed in the northern part of the kampos (Grid reference on **Figure 2.2-11**: III/6C/40/40. Altitude: c. 230m asl).

Ground cover: olive cultivation

HORIZON	THICKNESS	MUNSELL	DESCRIPTION
a	0.2 m	10YR 4/3	Sandy silt. Very frequent inclusions of calcite and angular frags of hard limestone up to c. 0.02m diameter
b1 (contained Turkish period sherd)	0.4 m	10 YR 5/3	Silty. Less compact than lower horizons. Occasional frags of calcite and rounded frags of hard limestone up to 0.05m diameter
b2	0.1-0.3 m	10YR 5/3	Silty, compact, homogeneous. Frequent frags of calcite and rounded frags of hard limestone up to 0.05m diameter.
b3	0.25-0.4 m		Silty, compact, homogeneous. Occasional angular frags of hard limestone and frags of calcite up to 0.05m diameter

**Observations:** The calcite fragments are concretions of limestone dissolved in the seasonal stream flows. The character of the inclusions show that the soil is developed from colluvium from the surrounding slopes, as well as from the stream deposits. This soil is leached towards the top like the other soils analysed here, but is low in available nutrients throughout its profile.



Table of analyses of chemical characteristics

Soil code	pH	Carbonate (%)	K (m. e.)	Na. (m.e.)	Mg (m.e.)	Ca (m.e.)	Overall CEC
D61 (a)	No result obtained	2	0.06	0.21	0.82	36.03	37.12
D61 (a1)	7.88	2	0.03	0.46	0.502	34.76	35.75
E31 (a)	7.37	17	No result obtained	0.51	No result obtained	No result obtained	
E31 (b1a)	7.94	38	0.88	0.38	93.13	303.64	398.03
E31 (b1)	7.77	2	0.47	0.79	6.96	412.87	421.09
E31 (b2)	6.98	1	0.18	0.55	0.76	186.28	187.77
E121 (a)	7.65	11	1.08	0.33	30.80	104.17	136.38
E121 (b1)	7.68	6	0.87	0.23	1.78	15.61	18.49
E121 (b2)	7.80	7.5	0.64	0.21	1.06	166.27	168.18
E102 (a)	7.83	29	0.62	0.32	32.16	84.77	117.87
E102 (b1)	7.80	22	0.65	0.51	30.81	104.17	136.14
E102 (b2)	7.84	34	0.41	0.25	23.46	160.52	184.64
E102 (c)	7.93	1	0.25	0.38	14.67	415.61	430.91
E481 (a)	7.56	2	0.24	0.36	2.44	29.09	32.13
E481 (b1a)	No result obtained	1	1.6	0.27	No result obtained	No result obtained	
E481 (b1)	7.73	2.5	0.16	0.38	2.21	49.46	52.21
E481 (b2)	6.93	31	0.15	0.44	2.50	20.85	23.94

*General conclusions*

In most of the samples there was some evidence for the leaching of salts upwards through evaporation (Bintliff 1977a: 90). Thus, higher CEC values were often found in the A horizon. Variability was often (though not always) considerable between horizons in the same profile, and validated the policy adopted throughout the fieldwork of sampling consistently in the upper 0.1-0.15 m of soil.

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### List of journal abbreviations used here

AAA *Athens Annals of Archaeology*  
 ABSA *Annual of the British School at Athens*  
 AD *Archaiologikon Deltion*  
 AE *Archaiologike Ephemeris*  
 AEA *Aegean Archaeology*  
 AJA *American Journal of Archaeology*  
 Archeologia (Warsaw) *Archeologia Rocznik Instytutu Archeologii i Etnologii Polskiej Akademii Nauk*  
 AR *Archaeological Reports* (Athens: Council of the Society for the Promotion of Hellenic Studies and the Managing Committee of the British School at Athens)  
 AS *Atene Annuario della R. Scuola Archaeologica di Atene*  
 BAR *British Archaeological Reports*  
 BCH *Bulletin de Correspondance Hellenique*  
 ECr *Etudes Crétoises*  
 JFA *Journal of Field Archaeology*  
 JHS *Journal of Hellenic Studies*  
 JMA *Journal of Mediterranean Archaeology*  
 KCh *Kritika Chronika*  
 PAE *Praktika tis Archaiologikis Etaireias*  
 RDAC *Report of the Department of Antiquities, Cyprus*  
 SMEA *Studii micenei ed egeo-anatolici*

### Common publisher abbreviations

CUP - Cambridge University Press  
 BAR- British Archaeological Reports  
 SIMA- Studies in Mediterranean Archaeology

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**VOLUME II**

**ILLUSTRATIONS**

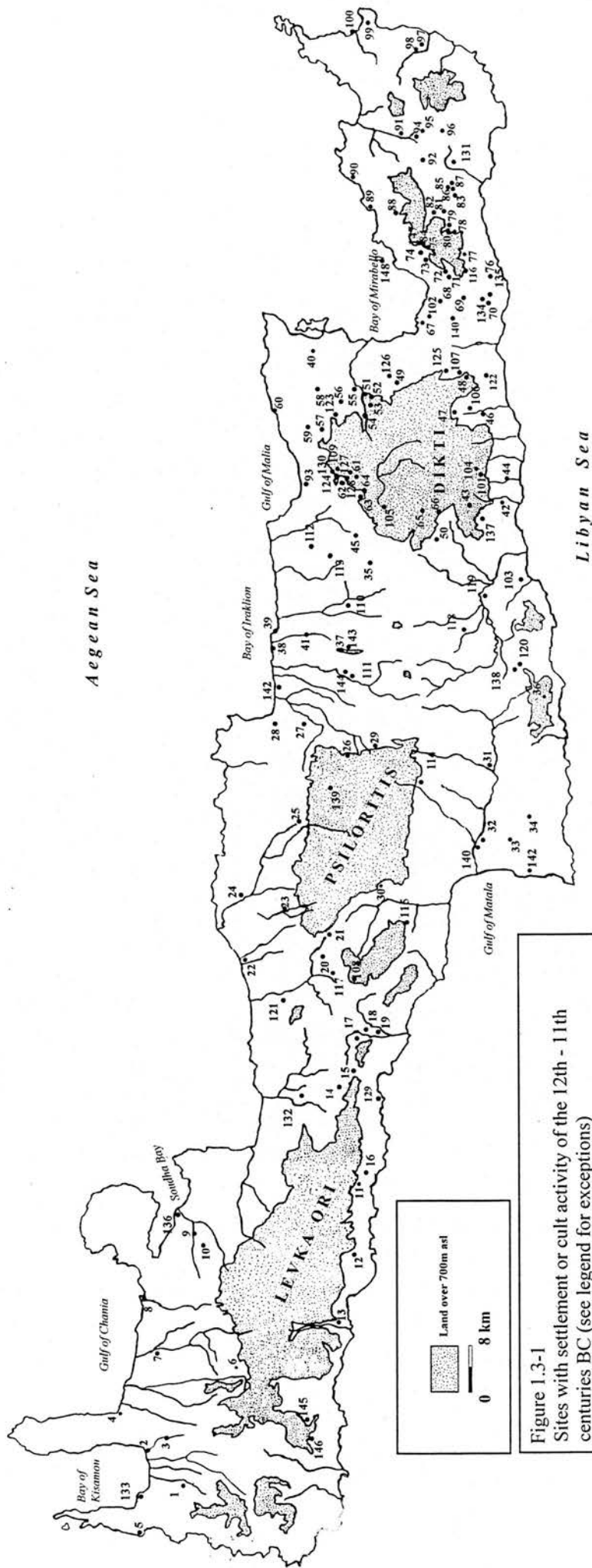


Figure 1.3-1  
Sites with settlement or cult activity of the 12th - 11th  
centuries BC (see legend for exceptions)



**List of sites shown on Figures 1.3-1, 3.1-4, 4.1-1, 4.1-2**

All sites listed without brackets have use dating to the LM IIIC/SM period.

Brackets enclose the names of sites with use apparently starting after LM III/SM.

Square brackets enclose the names of sites with use for cult in LM IIIC/SM, but apparently without associated settlement.

Very small sites found through intensive survey - e.g. farmhouses, hamlets - are not marked, since published data on these is so uneven, and because the scale used here does not allow their locations to be accurately shown. See Chapters 2.2, 3.1, 4.1 for further discussion of this type of site.

1. Polirinia
2. Nopigia
3. Rokka Kissamou
4. Ghribiliana Ayia Irini
5. Falasarna
6. Hosti
7. Vrises Ayios Giorgios
8. Chania Kastelli
9. Stylos
10. Samonas
11. Ayios Giorgios Katri
12. Anopolis
13. Ayia Roumeli
14. Kali Sykia Agori
15. Mirthios Kiriimianou
16. Patsianos Kefali
17. Atsipades Fonises
18. Frati Kefala
19. Frati Kefali
20. Pandanassa Veni
21. Thronos Kefala
22. Hamalevri
23. Eleutherna
24. Ta Grivila
25. Axos
26. Krousonas Koupo
27. Tyliossos
28. Rogdia Kastrokefala Almyrou
29. Prinias Patela
30. Ayios Ioannis (Apodhoulou)
31. Gortyn
32. Phaistos
33. Sivas
34. Pobia Vigla
35. Kastelli Pediada
36. Kofinas
37. [Jouktas]
38. Katsambas
39. Amnisos
40. Elounda Oxa
41. Knossos
42. Viannos Keratos
43. Loutraki Kandilioro
44. Arvi Fortetsa
45. Lyttos
46. Mythi Castello
47. Males/Christos Skistra
48. Anatoli Mesakastello
49. Kritsa Castello
50. Afrati Profitis Elias (Arkades)
51. Tapes Kato Castello
52. Tapes Charakas
53. Tapes Epáno Castello
54. Zenia Kastrokefala
55. Adrianos Fortetsa
56. Vrises Profitis Elias
57. Neapoli Katri
58. Dreros
59. Vrachasi Anavlochos
60. Milatos Castello
61. Kera Karfi
62. Krasi Siderokefala

63. Gonies to Flechtron
64. Gonies Porolios
65. Mari
66. Erganos Kefali
67. Vrokastro
68. Asari Kefala
69. Kato Chorio Profitis Elias
70. Vainia Stavromenos
71. Monastiraki Chalasmenos
72. Monastiraki Katalimata
73. Kavousi Vronda
74. Azoria
75. Kavousi Kastro
76. Koutsounari Karfi
77. Ayios Ioannis Psychro
78. Oreino Petroskopia
79. Oreino Kastri
80. Oreino Ellinika
81. Stavrochori Skalia
82. Chrisopigi Korakia
83. Ayios Stefanos Kastello
84. Avgo Melisses
85. Pefki Kastellopoulo
86. Pefki Mega Chalavro
87. Pefki Stavromenos
88. Turloti Kastri
89. Mirsini Kastello
90. Chamaizi Liopetra
91. Sfakia Kastri
92. Kria Ayios Giorgios
93. Malia town
94. Praisos
95. Kalamafki Kipia
96. Chandras Voila Kastri
97. Zakros Kato Kastello
98. Zakros Ellinika
99. Kalamafka Plakalona
100. Palaikastro Kastri
101. Pefkos Boubouli
102. Vrokastro Ayios Fainourios
103. [Tsoutsoros Cave]
104. [Kato Simi]
105. [Psychro Cave]
106. Mythi Zonari
107. Anatoli Sochores
108. Spili Vorisi
109. Krasi Armi
110. Astritsi Kefala
111. Profitis Elias Rokka
112. Kalo Chorio Maza
113. Smari Profitis Elias
114. Kourtes Kefala
115. Orne Kastello
116. Ayios Ioannis Katalimata
117. Patsos Cave
118. Ligortinos Kefala
119. Kasteliana Kastello
120. Rotasi Korifi
121. Prasies Kastri
122. Anatoli Elliniki Korifi
123. Drasi Xeli
124. (Kera Kastello)
125. Kalamafka Kastello
126. Lato
127. (Kera Papoura)
128. (Kera Vigla)
129. Sellia Kastri
130. Krasi Kastello
131. Lithines Adromyloi Anginares
132. Lappa
133. Traxilos Selli
134. (Vainia Charakas)
135. (Vainia sto Skouro)
136. (Aptera)
137. (Viannos Korakias)
138. Rotasi Kefala

- 139 [Idaeon Cave]
- 140. [Ayia Triada]
- 141. [Gazi]
- 142. [Kommos]
- 143. Archanes town
- 144. Profitis Elias Korifi
- 145. (Elyros)
- 146. (Irtakina)
- 147. Avgo Trapeza
- 148. Pseira town

*Sources for the site data reproduced on these three maps (main sources only: others are cited in text)*

Nowicki 1987, 1988, 1990, 1991, 1992a, 1992b, 1993, 1994a; 1995a, 1995b, 1996, 2000 (the last relies on many sources cited by him and elsewhere in the present work) and (alphabetically) Alexiou 1955; Andreadaki-Vlasaki 1991a, 1991b; 1994/6; Coulson and Tsipopoulou 1994; Day et al 1986; Gesell et al 1983, 1988, 1991, 1995; Haggis 1993, 1996, forthcoming; Hallager and Hallager 2000; Hayden 1988; Hood and Warren 1966; Kanta and Stampolidis forthcoming; Nixon et al 1989; Moody et al 1998a, 1998b, forthcoming; Rocchetti 1970, 1974, 1994; Rutkowski and Nowicki 1985, 1986, 1987, 1990; Watrous et al 1993; Vokotopoulos 1998.

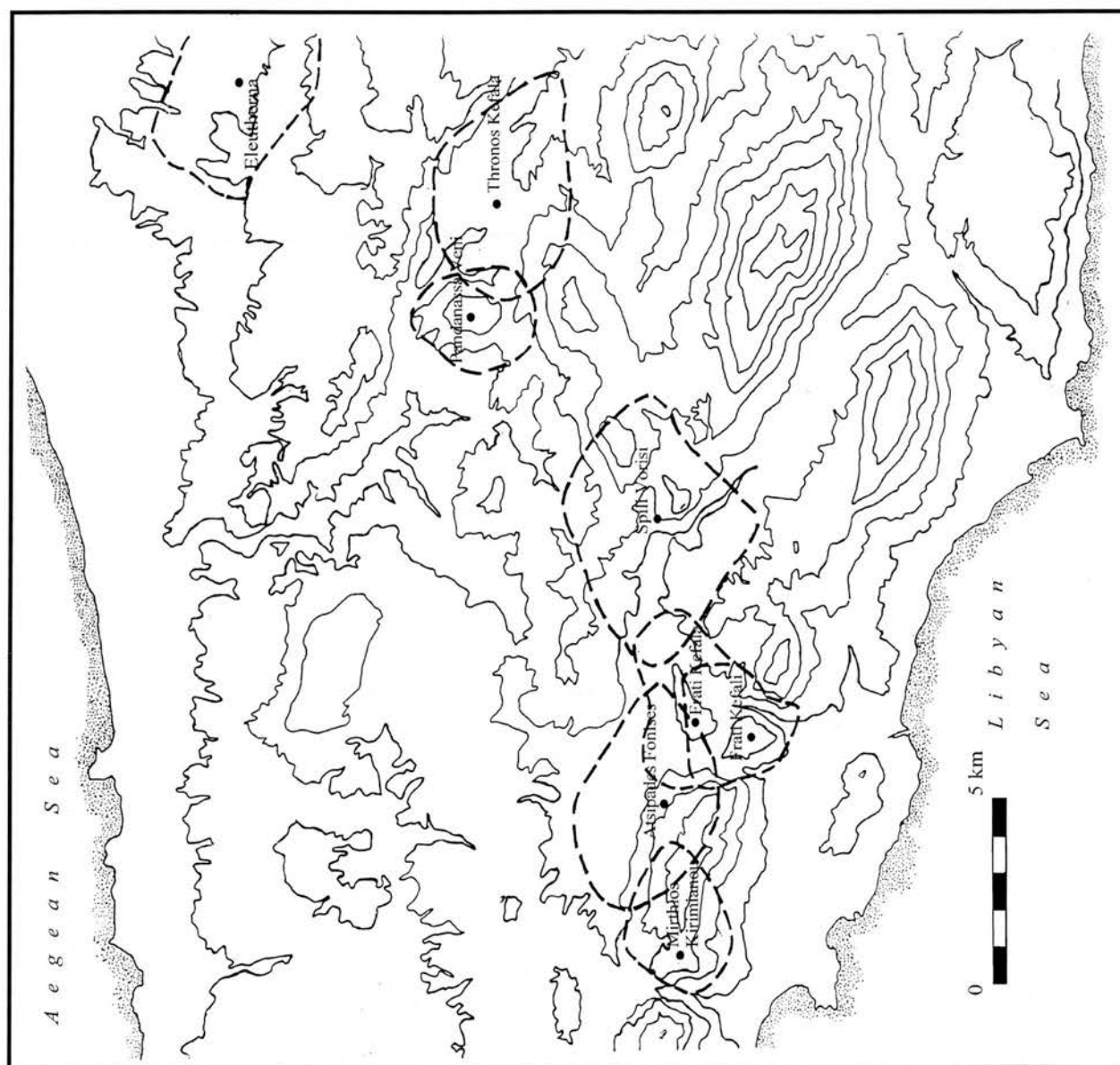
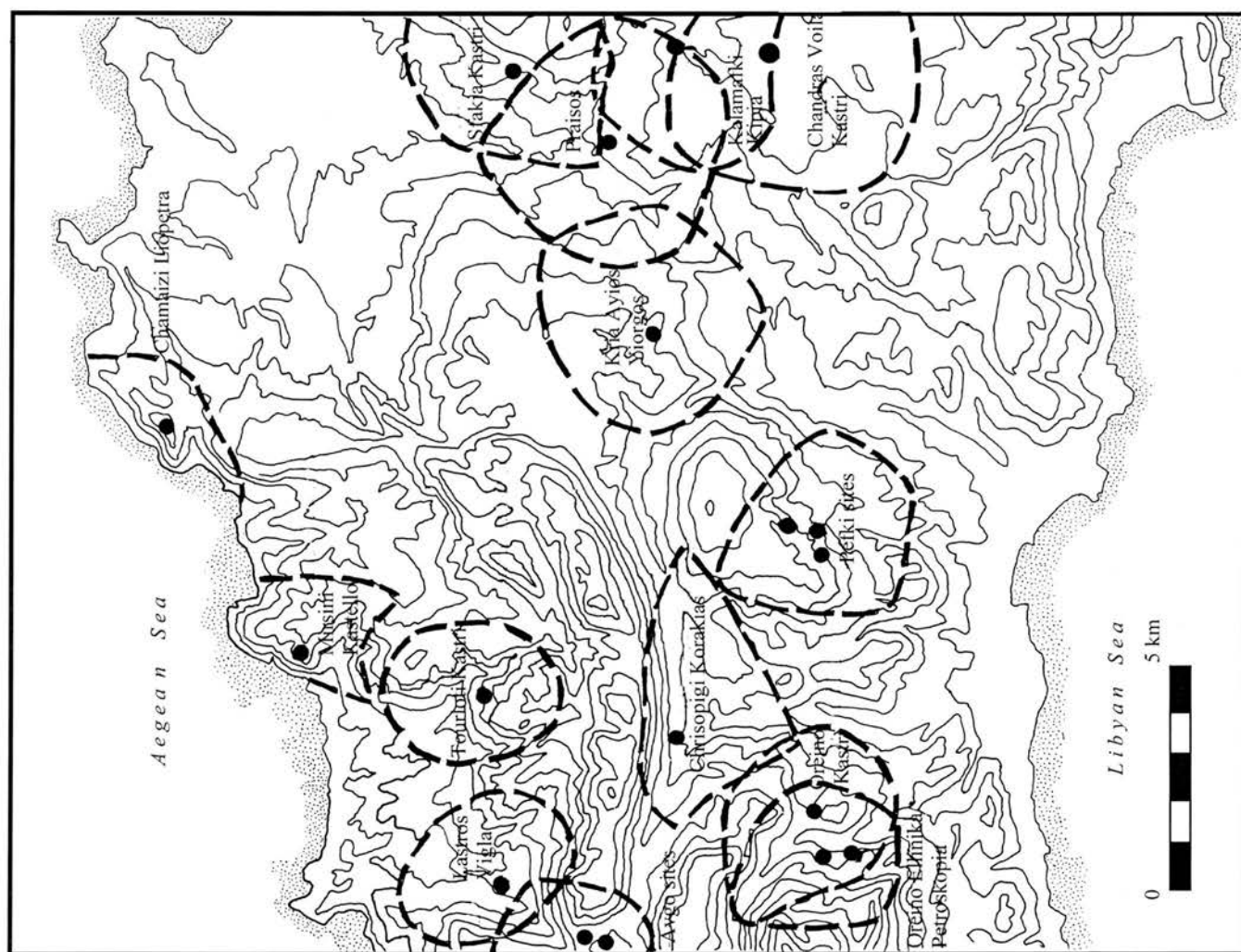


Figure 2.1.1-1  
1-hour ranges of EIA sites in the Rethymnon isthmus







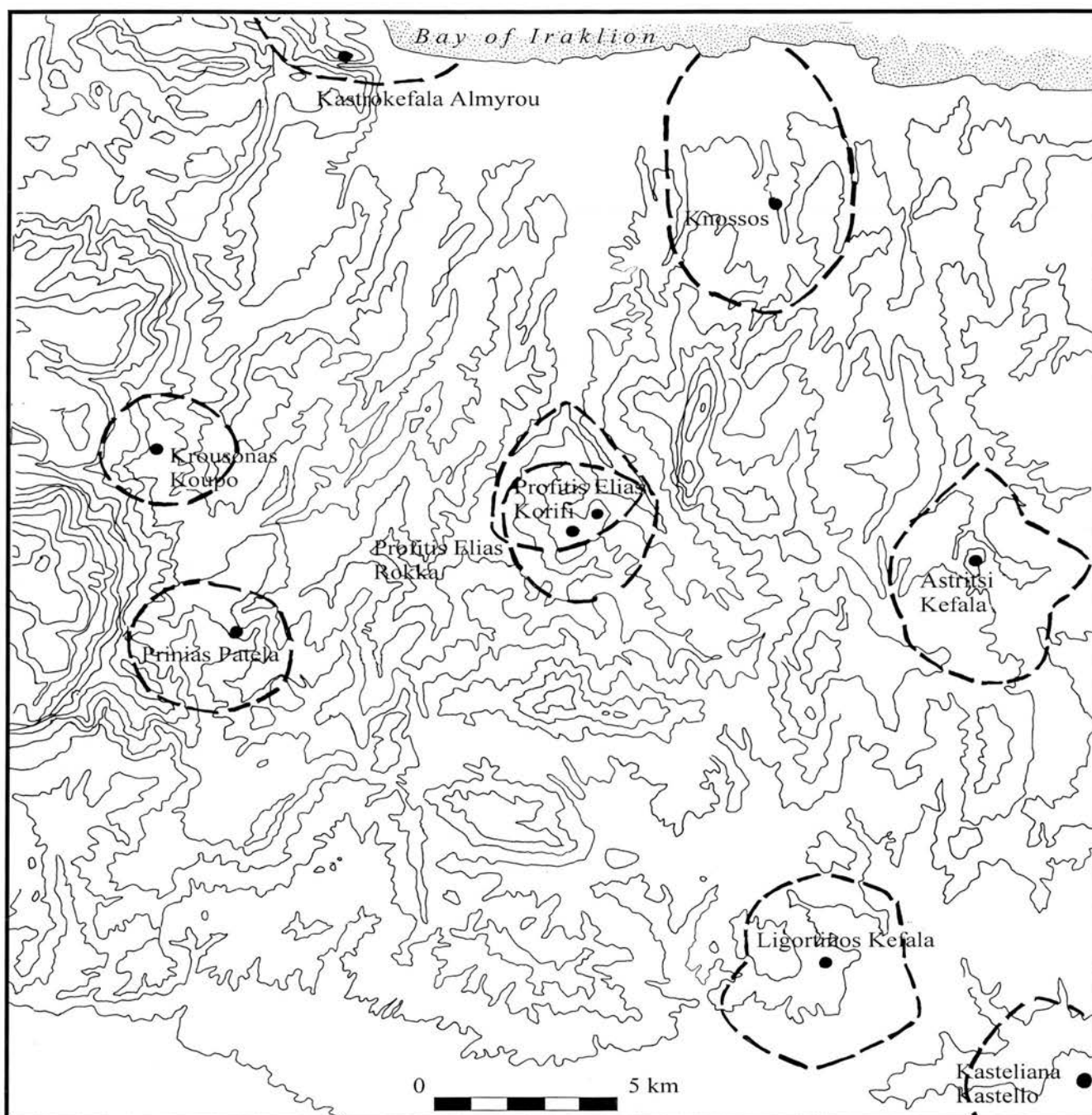


Figure 2.1- 4  
1 - hour ranges of EIA sites in central Crete

# AYIOS VASILIOS VALLEY

9

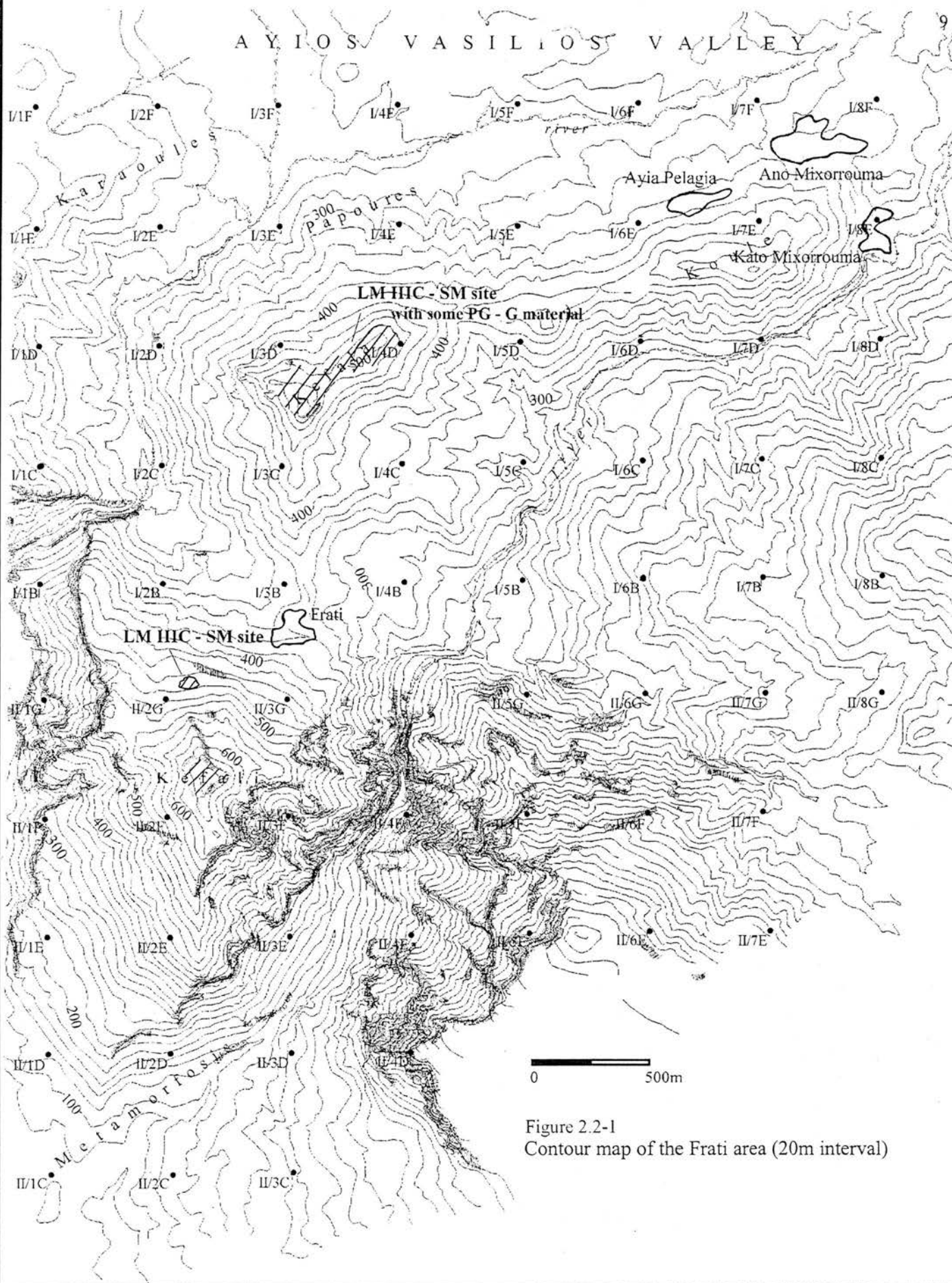


Figure 2.2-1  
Contour map of the Frati area (20m interval)

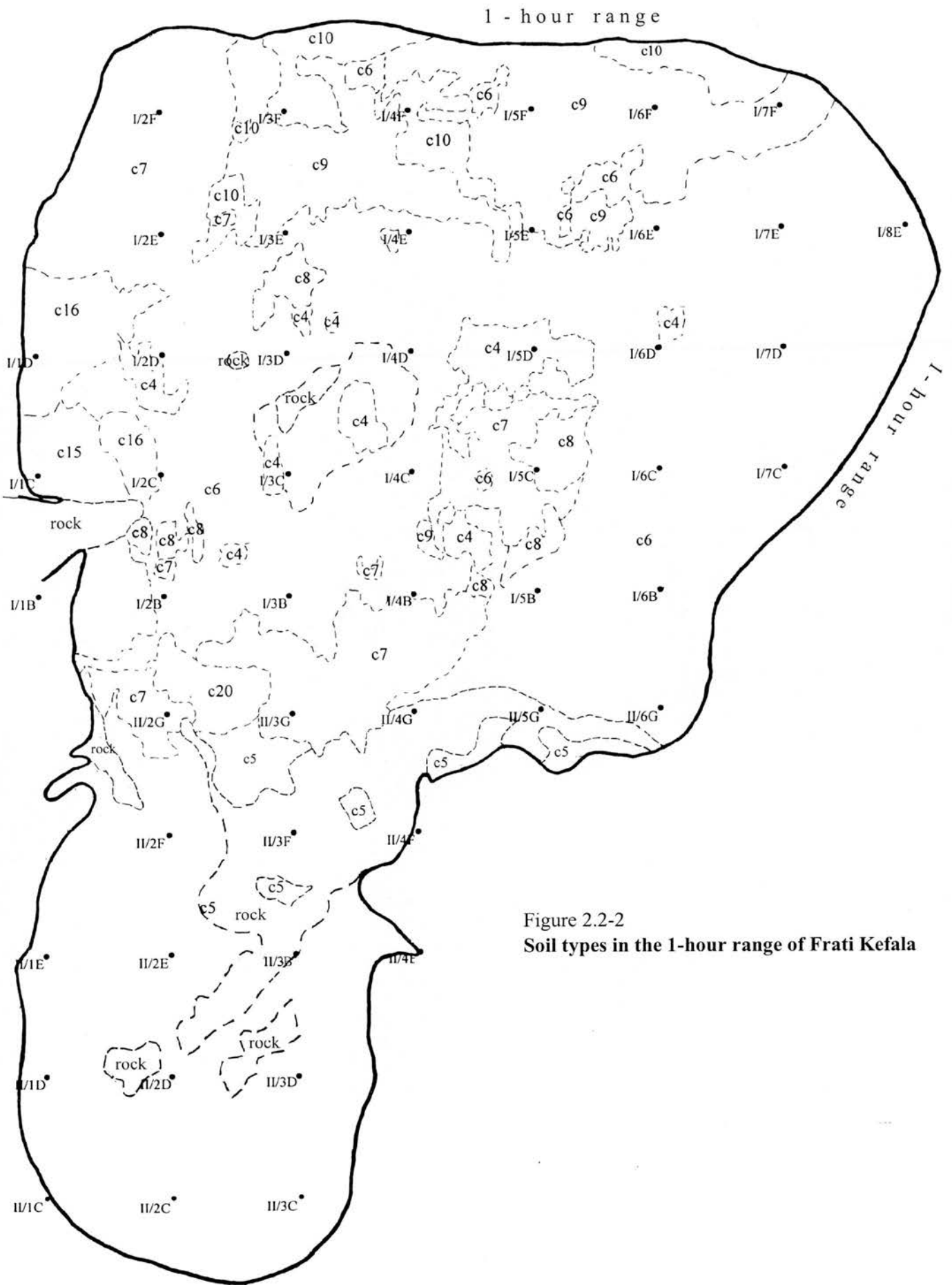
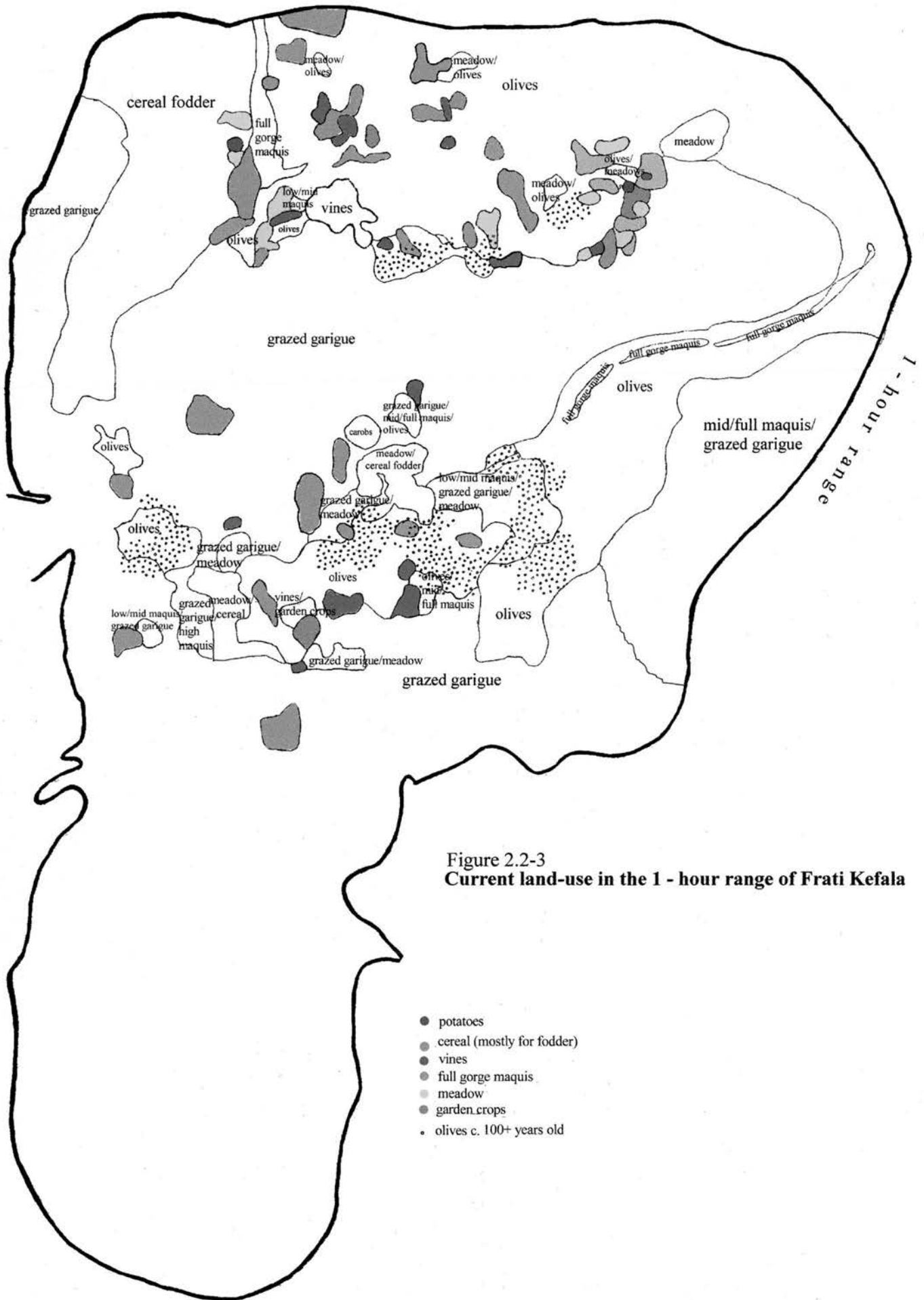


Figure 2.2-2  
Soil types in the 1-hour range of Frati Kefala



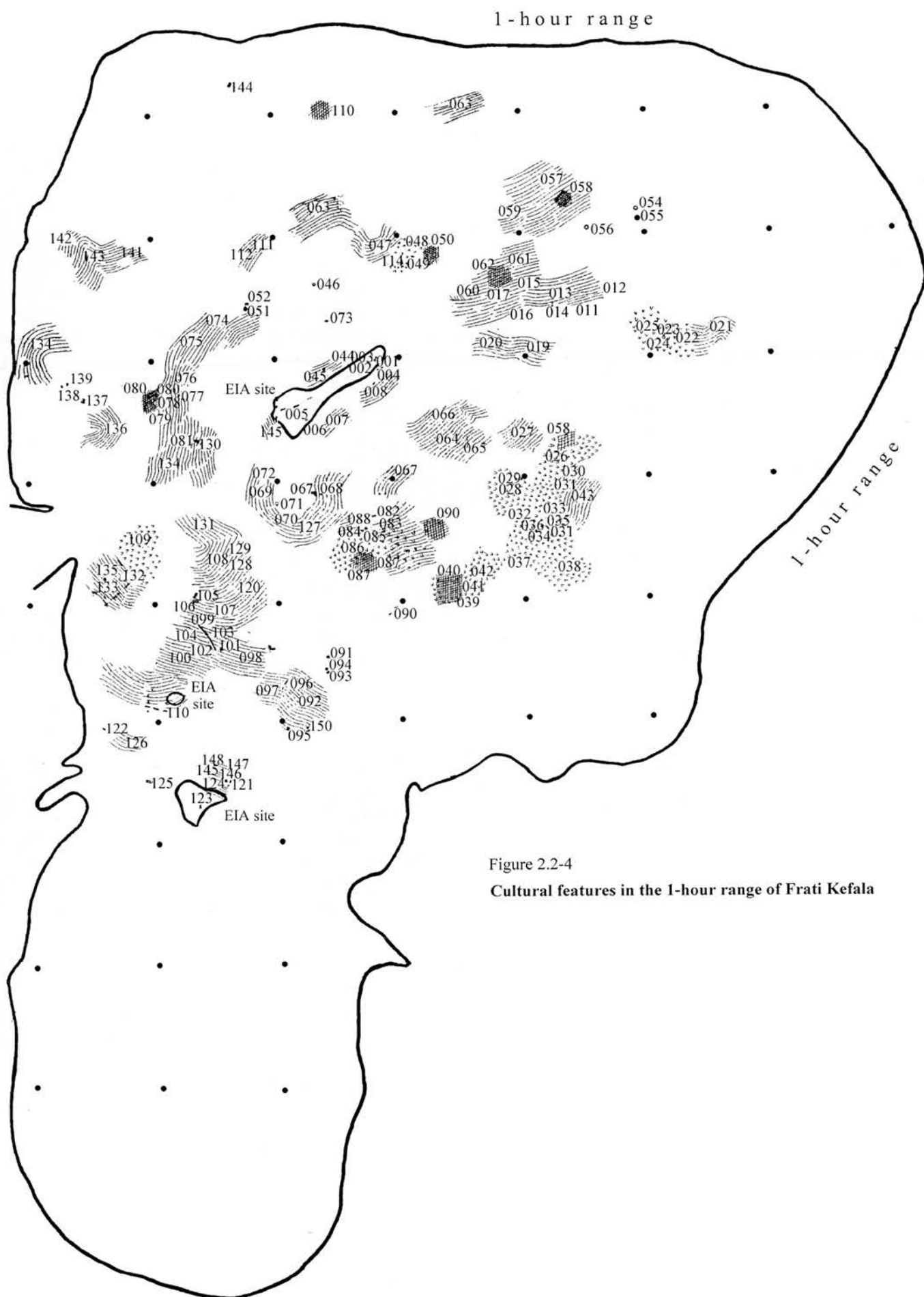
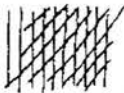
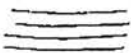
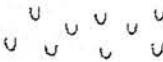











Figure 2.2-4

Cultural features in the 1-hour range of Frati Kefala

Legend for cultural features maps (not to scale)

	sites indicated by pottery scatters and/or structures
	shelf terraces
	pocket terraces
	<i>aloni</i> (threshing floor)
	non-structural wall
	cistern
	structure
	enclosure
	chapel
	well
	lime-kiln
	kalderimi (rough cobbled path/road)



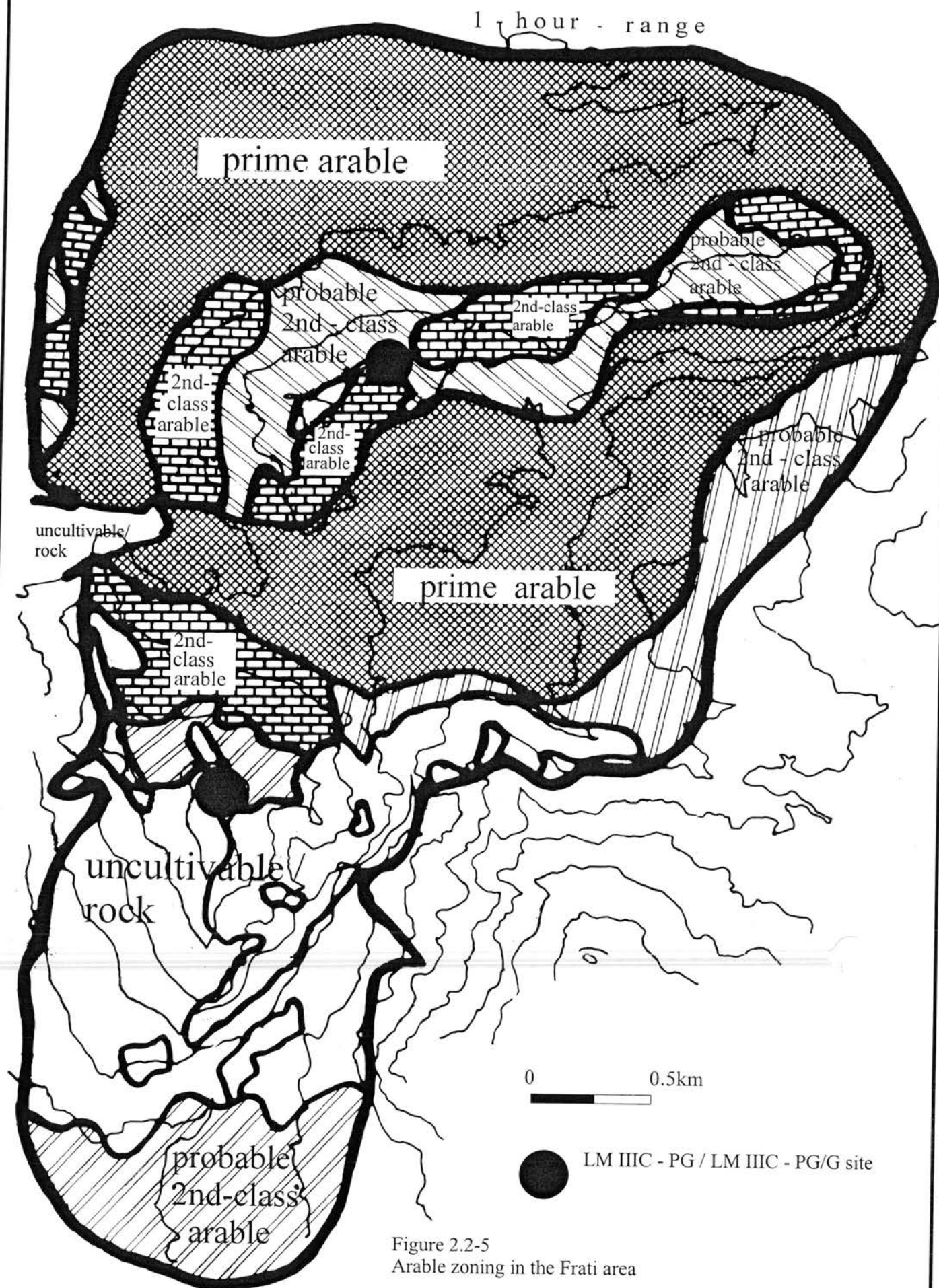


Figure 2.2-5  
Arable zoning in the Frati area

Figure 2.2-6  
Contour map of the Vrachasi  
area (20m interval)

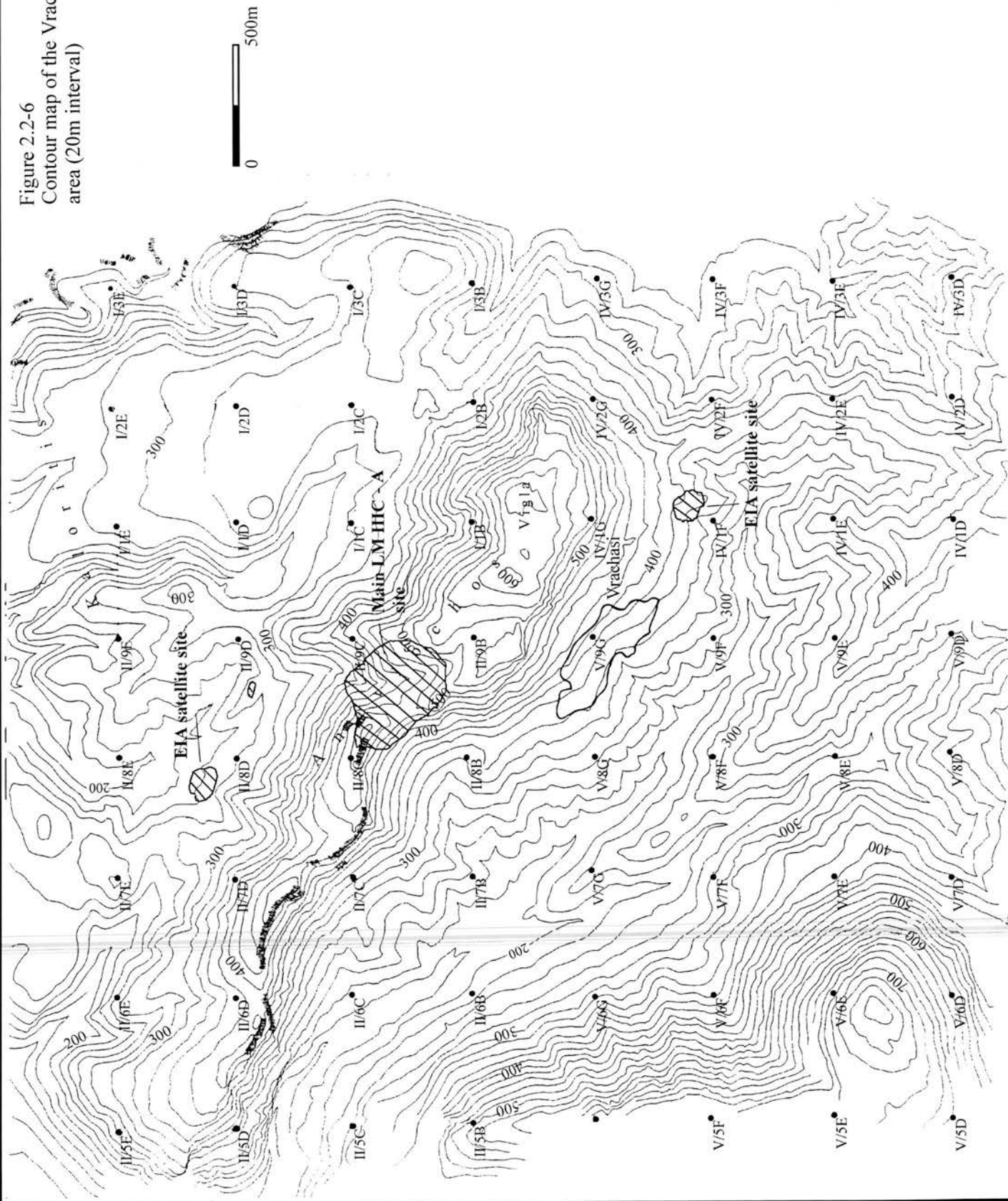


Figure 2.2-7

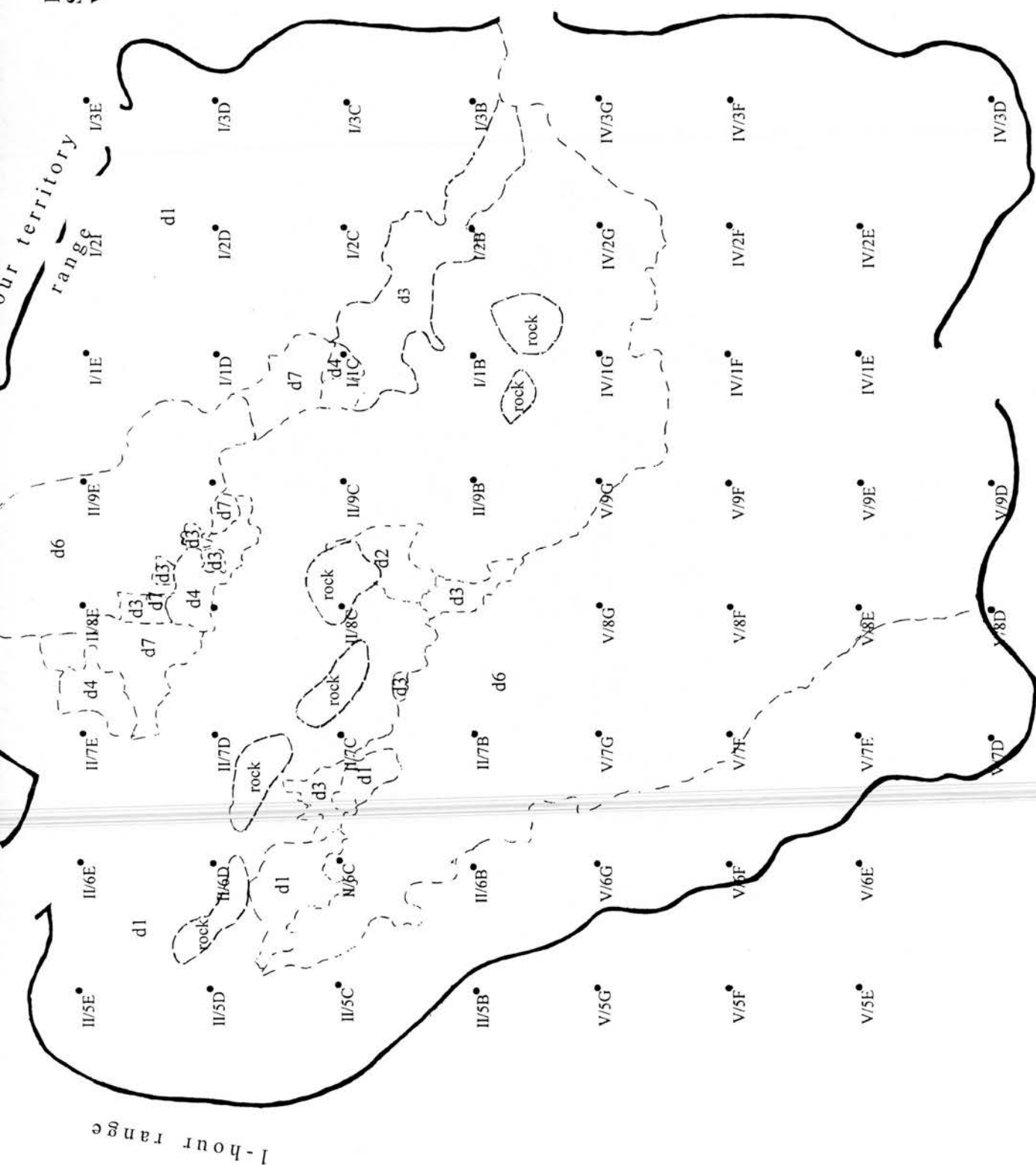
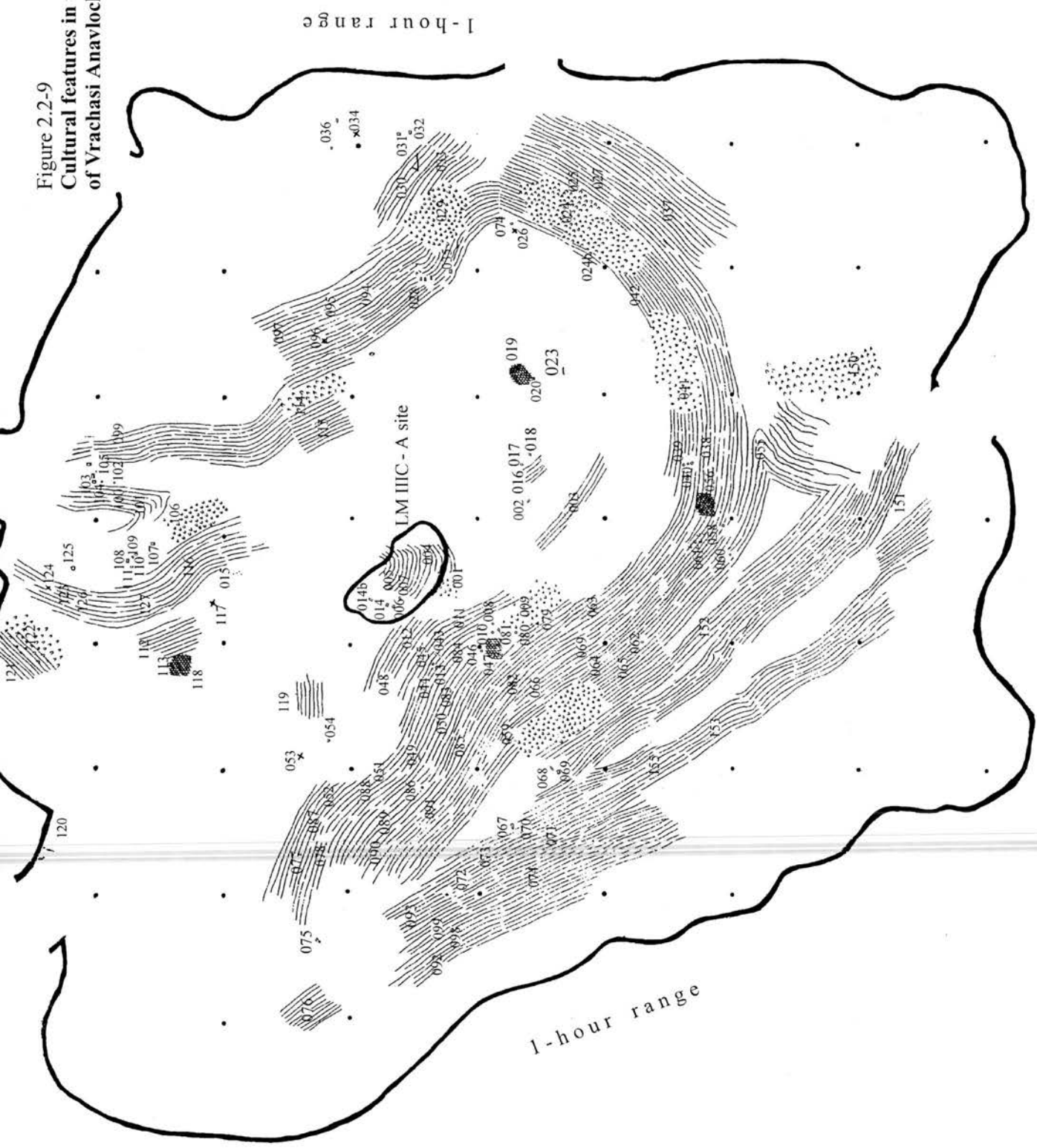




Figure 2.2-9  
Cultural features in the 1 - hour range  
of Vrachasi Anavlochos





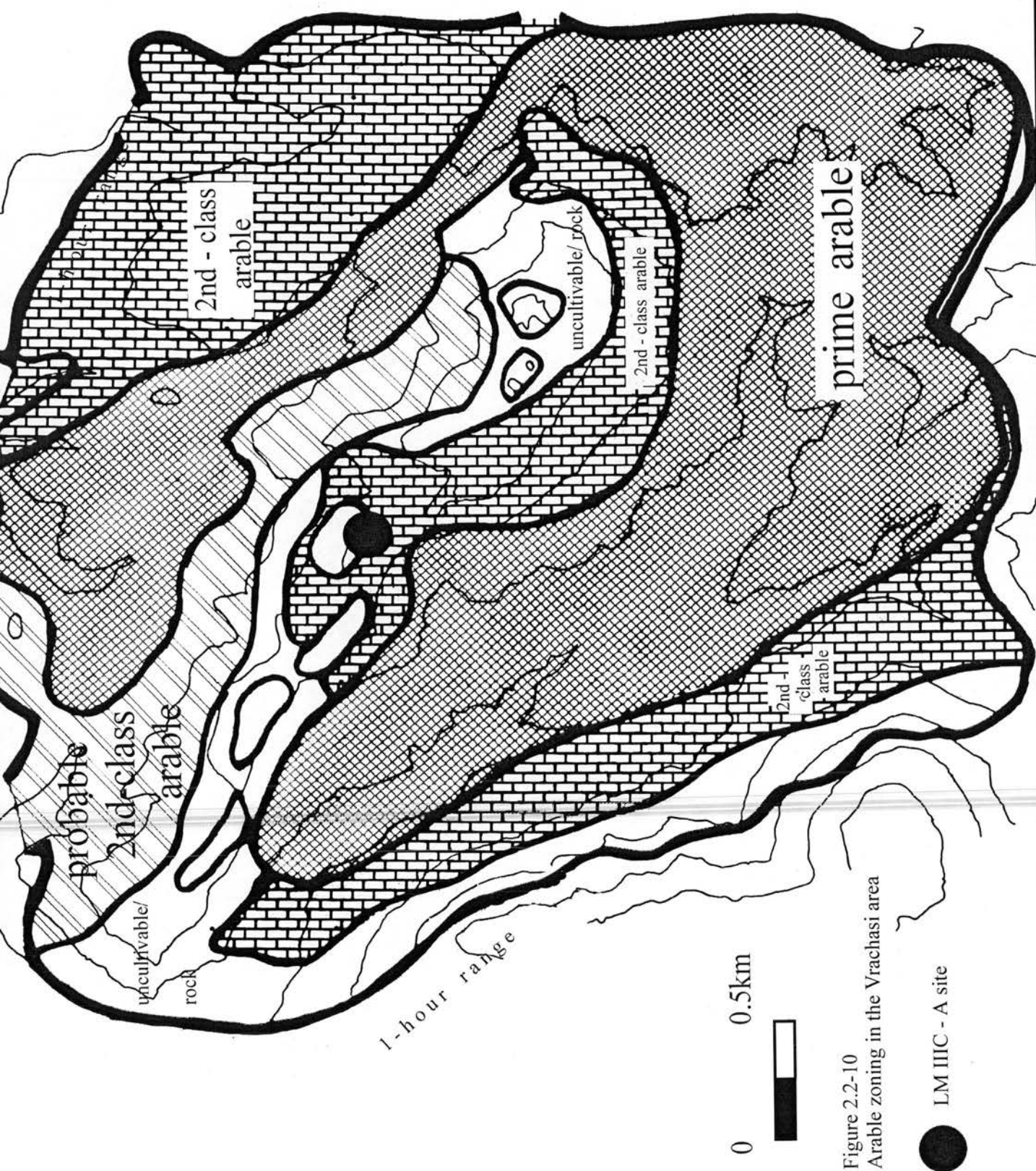


Figure 2.2-10  
Arable zoning in the Vrachasi area

LM IIIC - A site



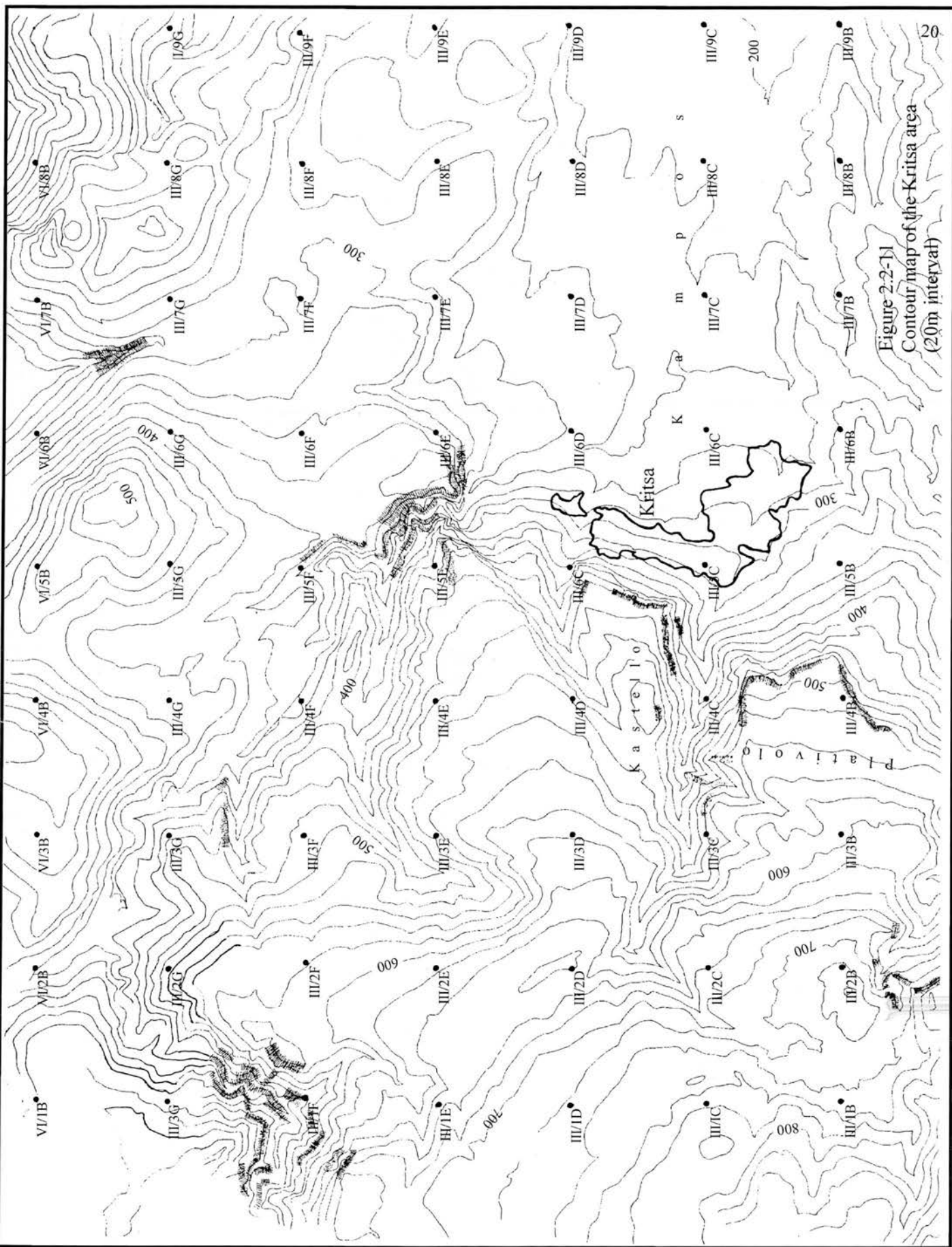


Figure 2.2-1-1  
Contour map of the Kriisa area  
(20m interval)

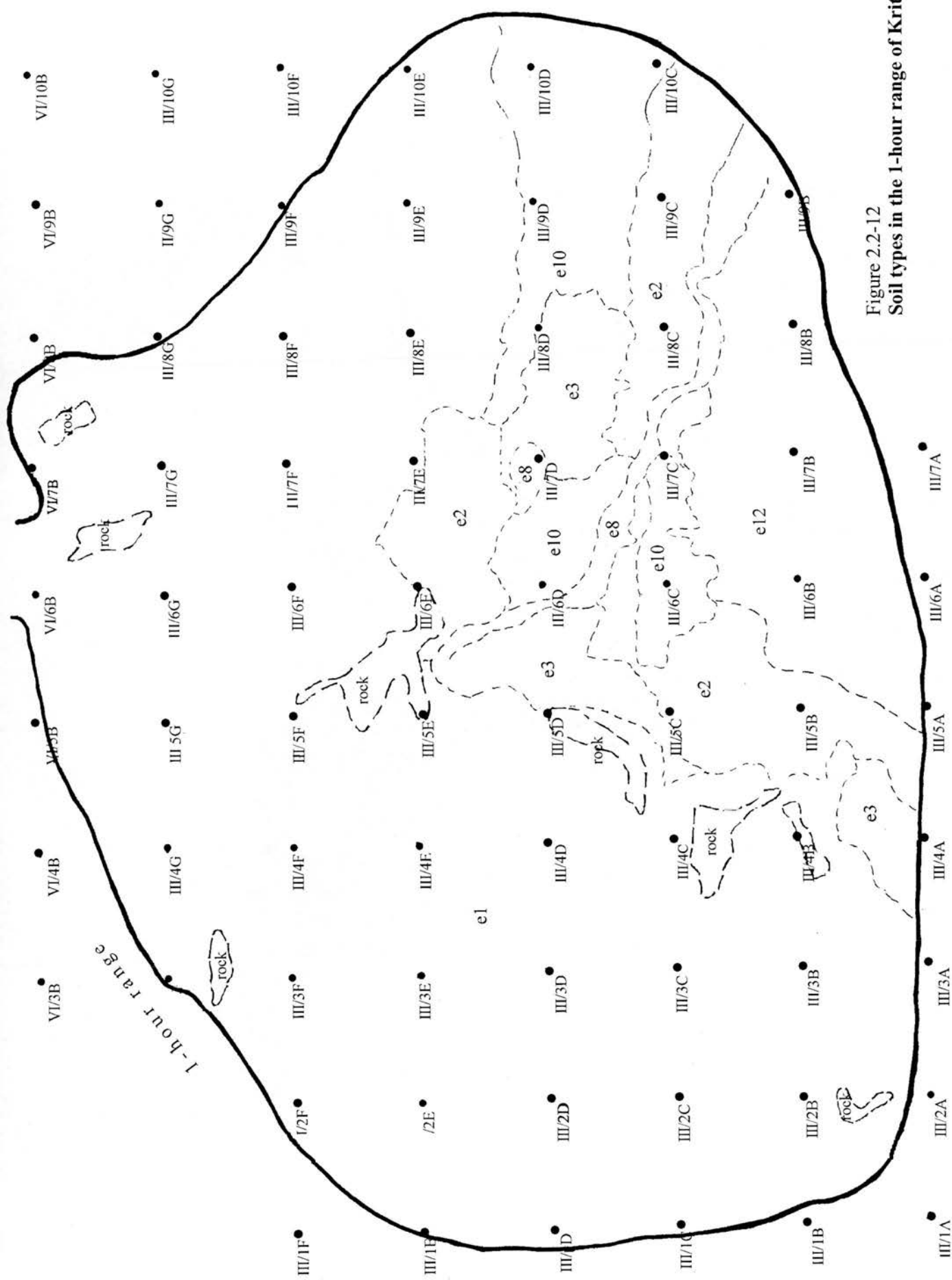
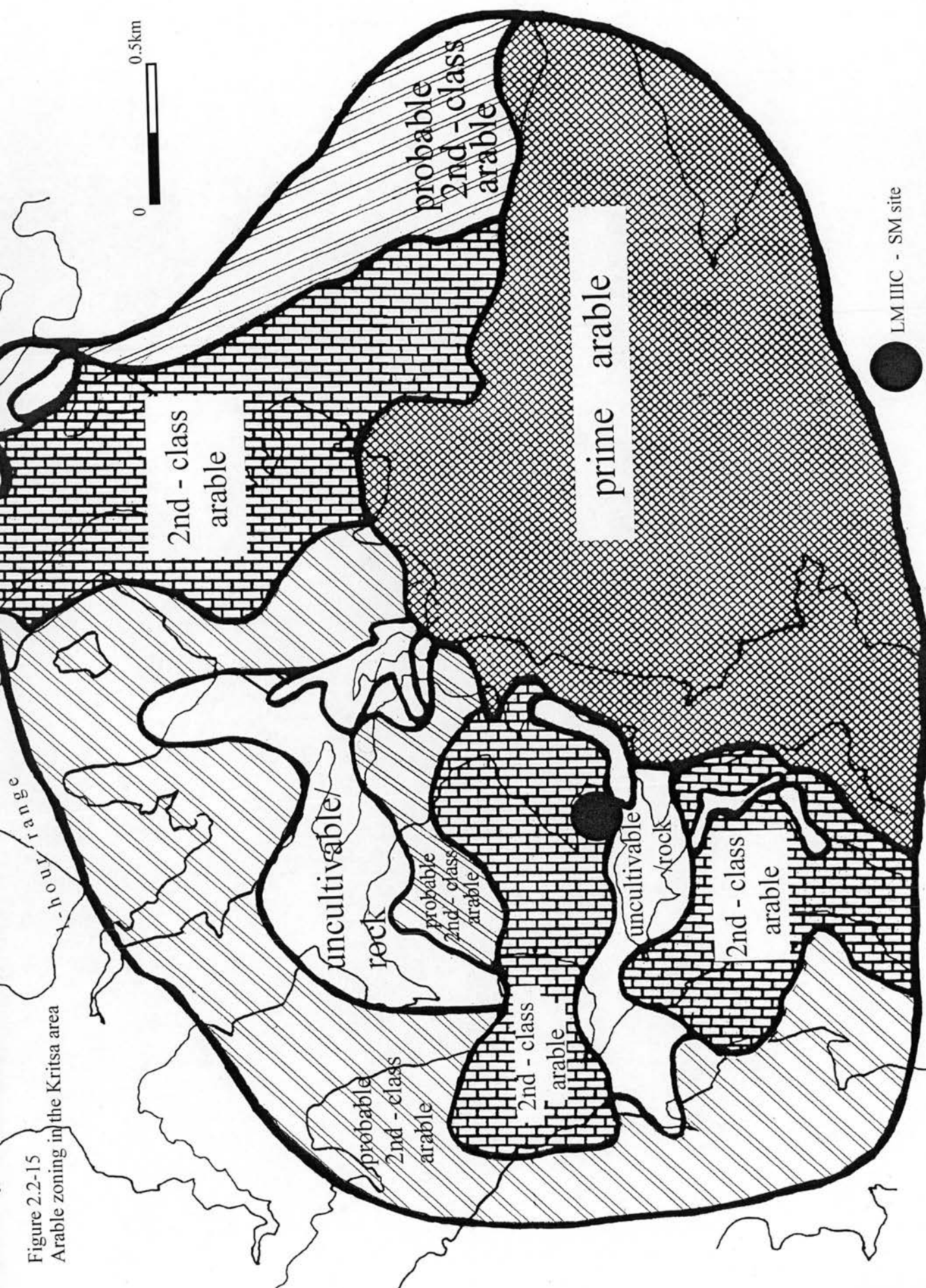


Figure 2.2-12  
Soil types in the 1-hour range of Kritsa Kastello



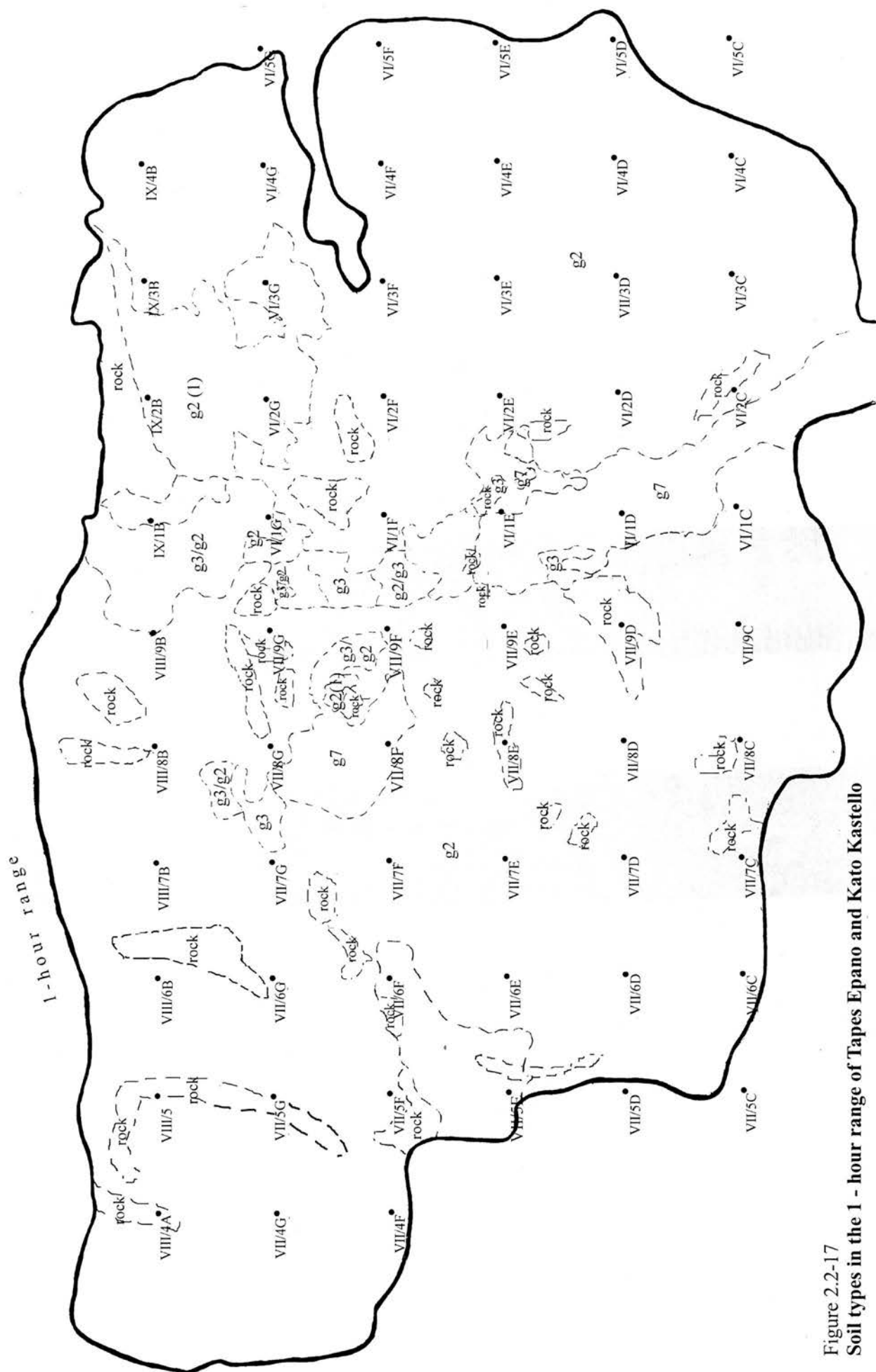














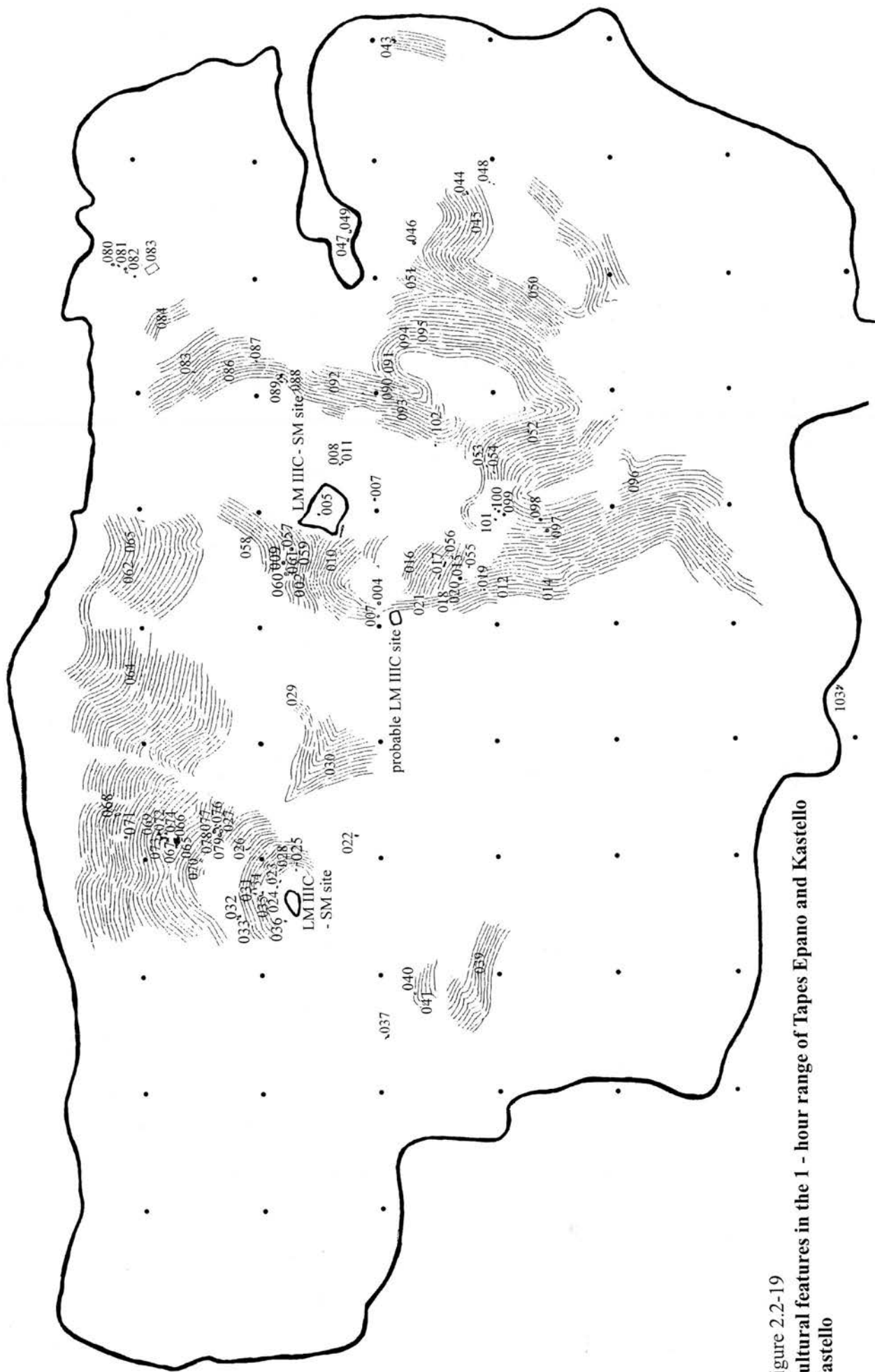


Figure 2.2-19

Cultural features in the 1 - hour range of Tapes Epiano and Castello  
Castello

↑ N

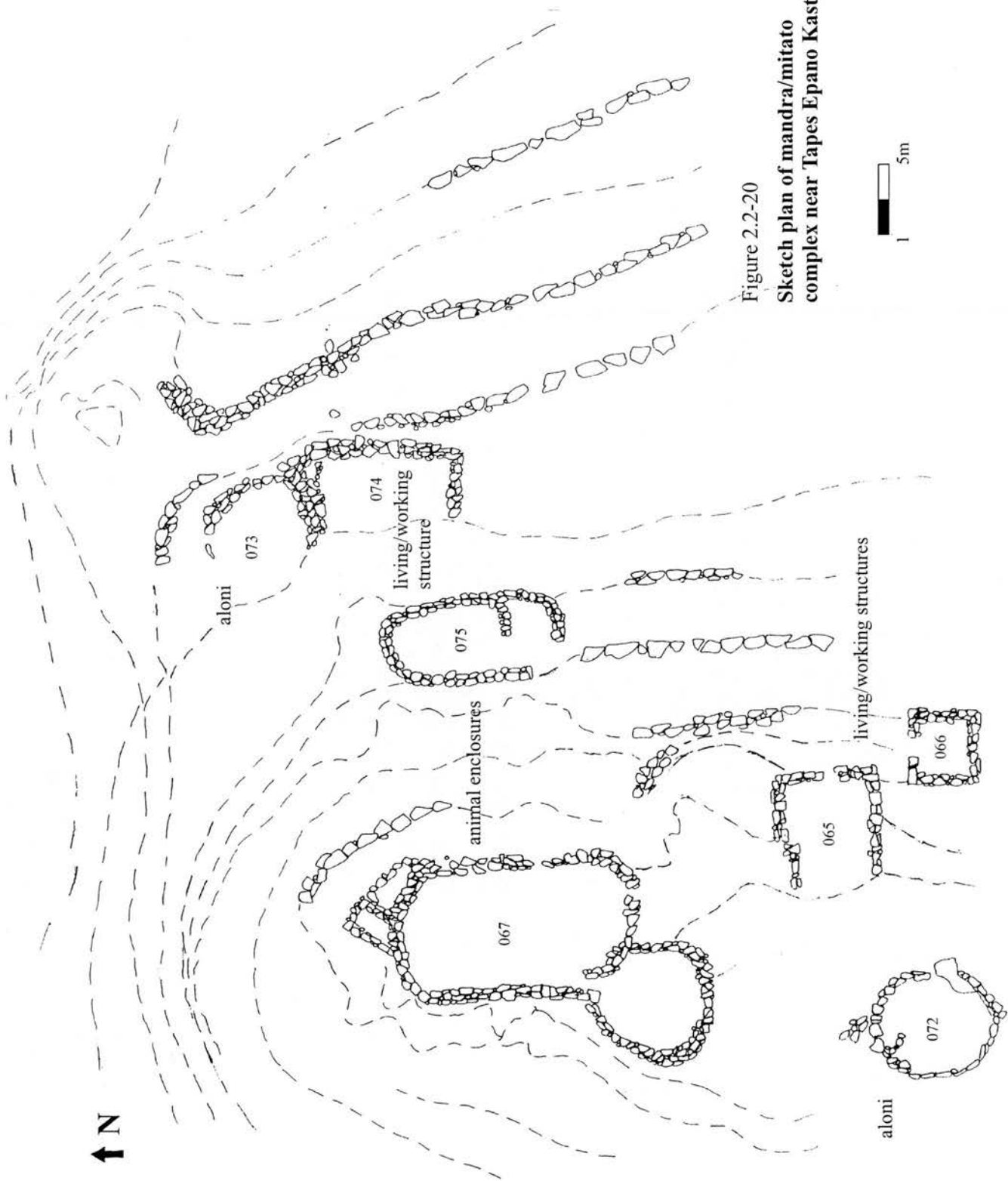


Figure 2.2-20  
Sketch plan of mandra/mitato  
complex near Tapes Epano Kastello

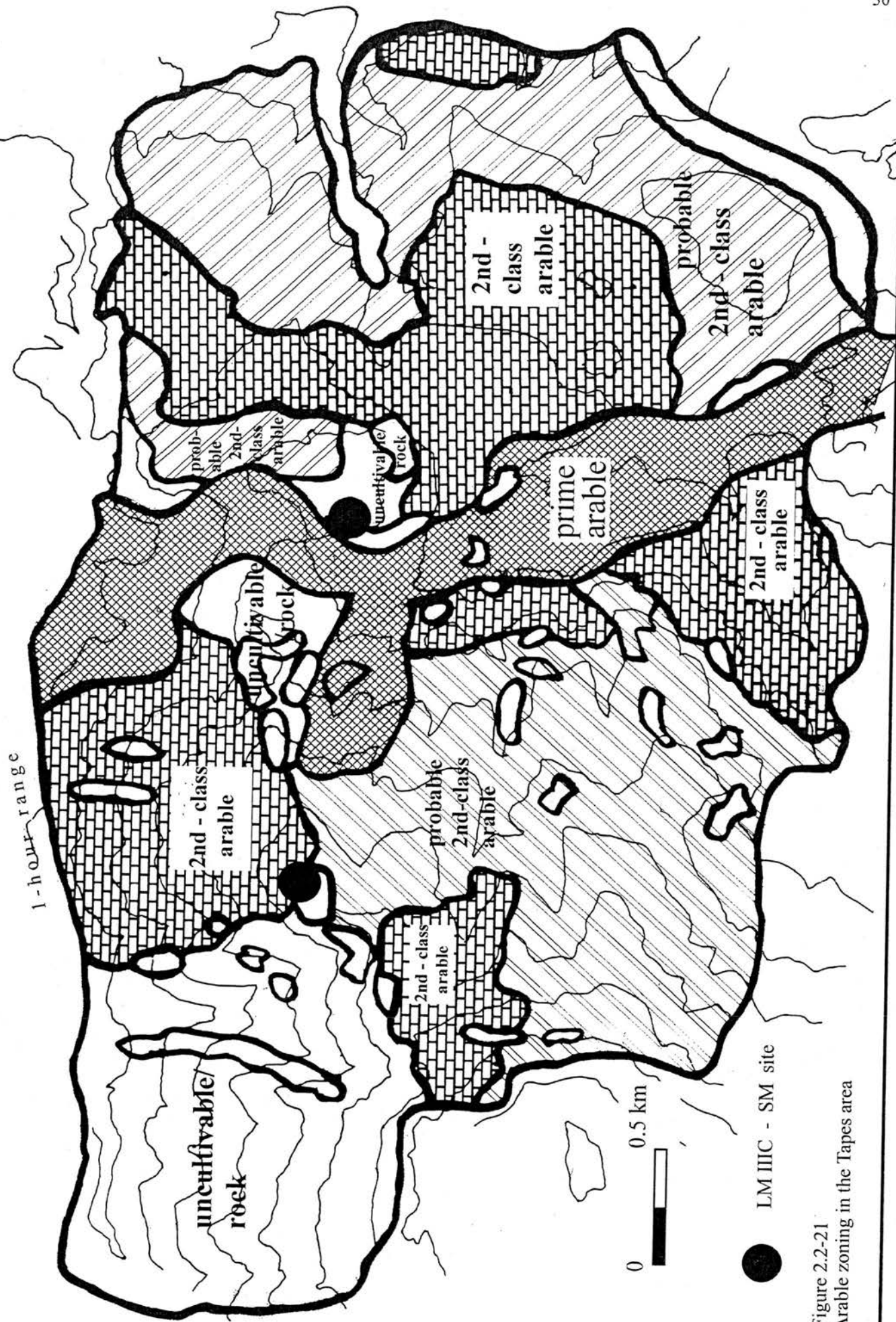
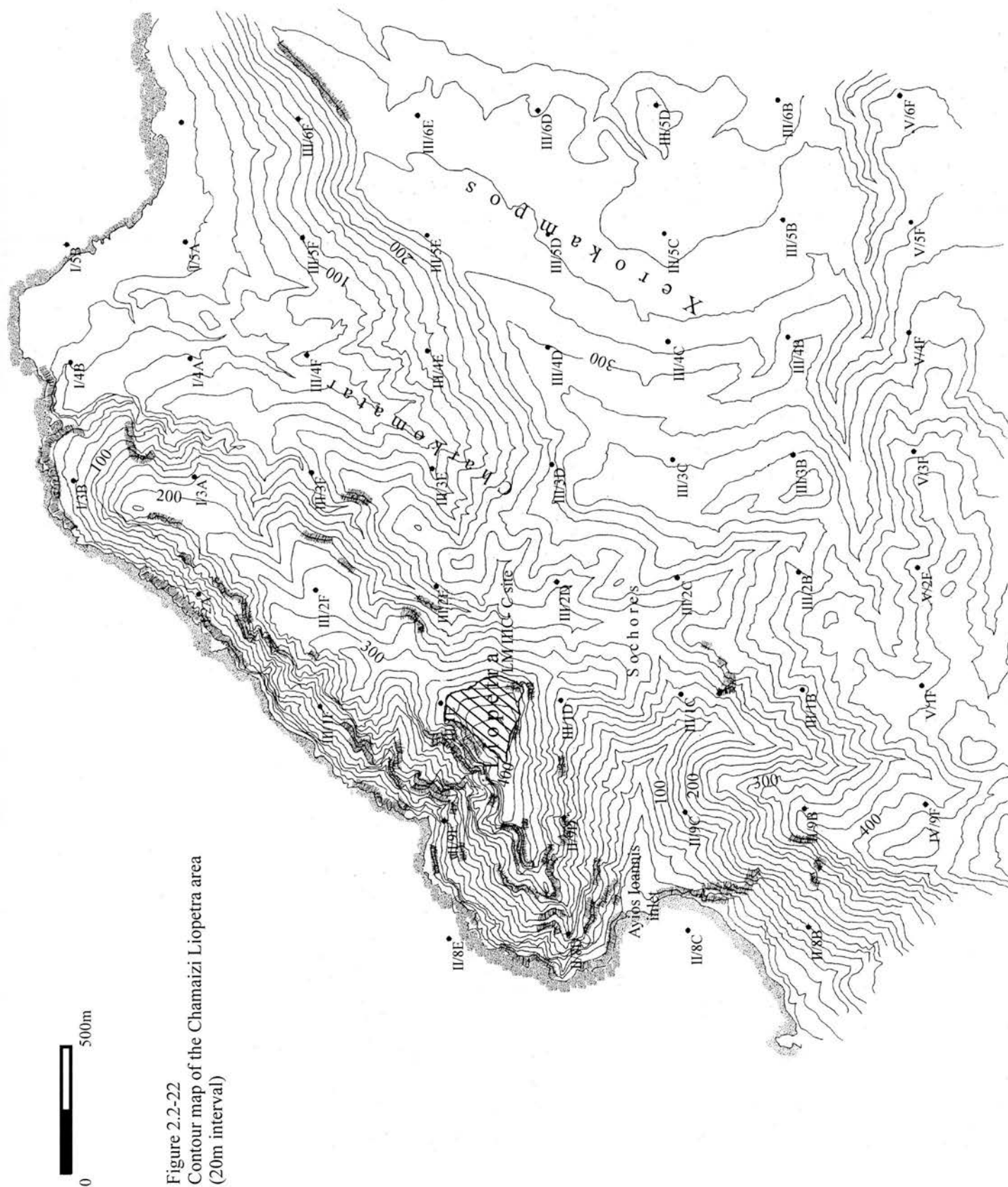


Figure 2.2-21  
Arable zoning in the Tapes area









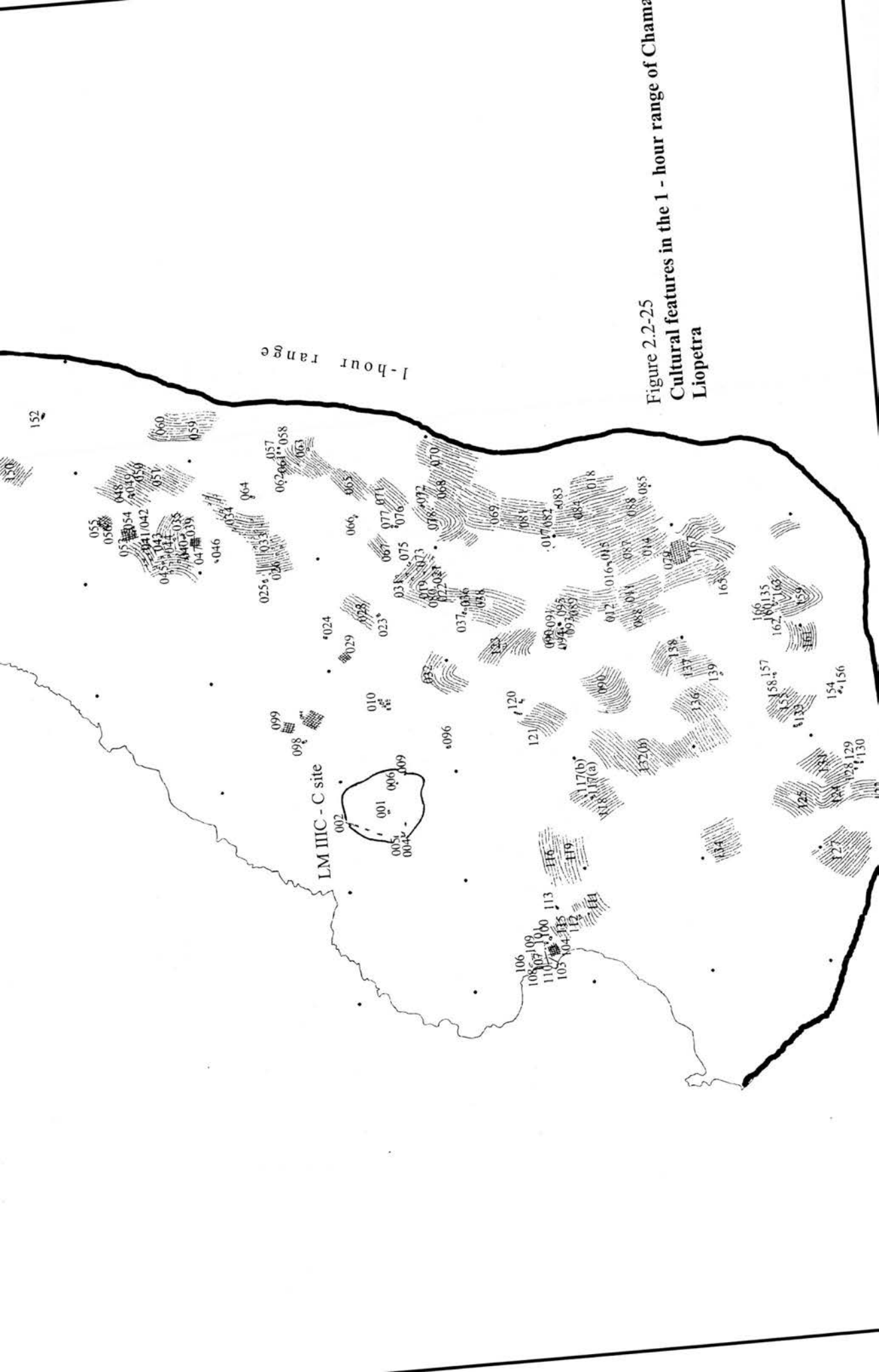


Figure 2.2-25  
Cultural features in the 1 - hour range of Chama  
Liopetra

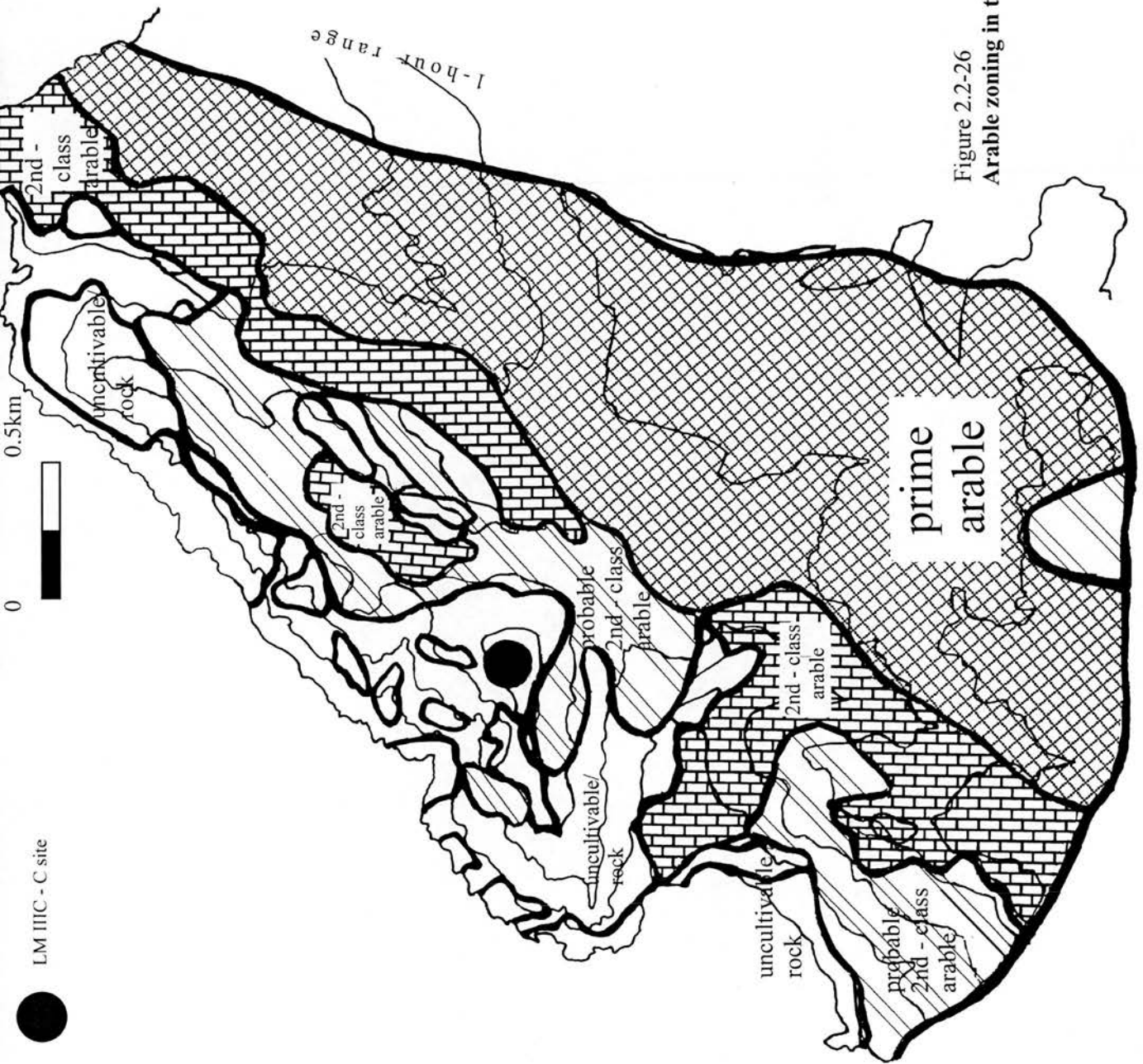
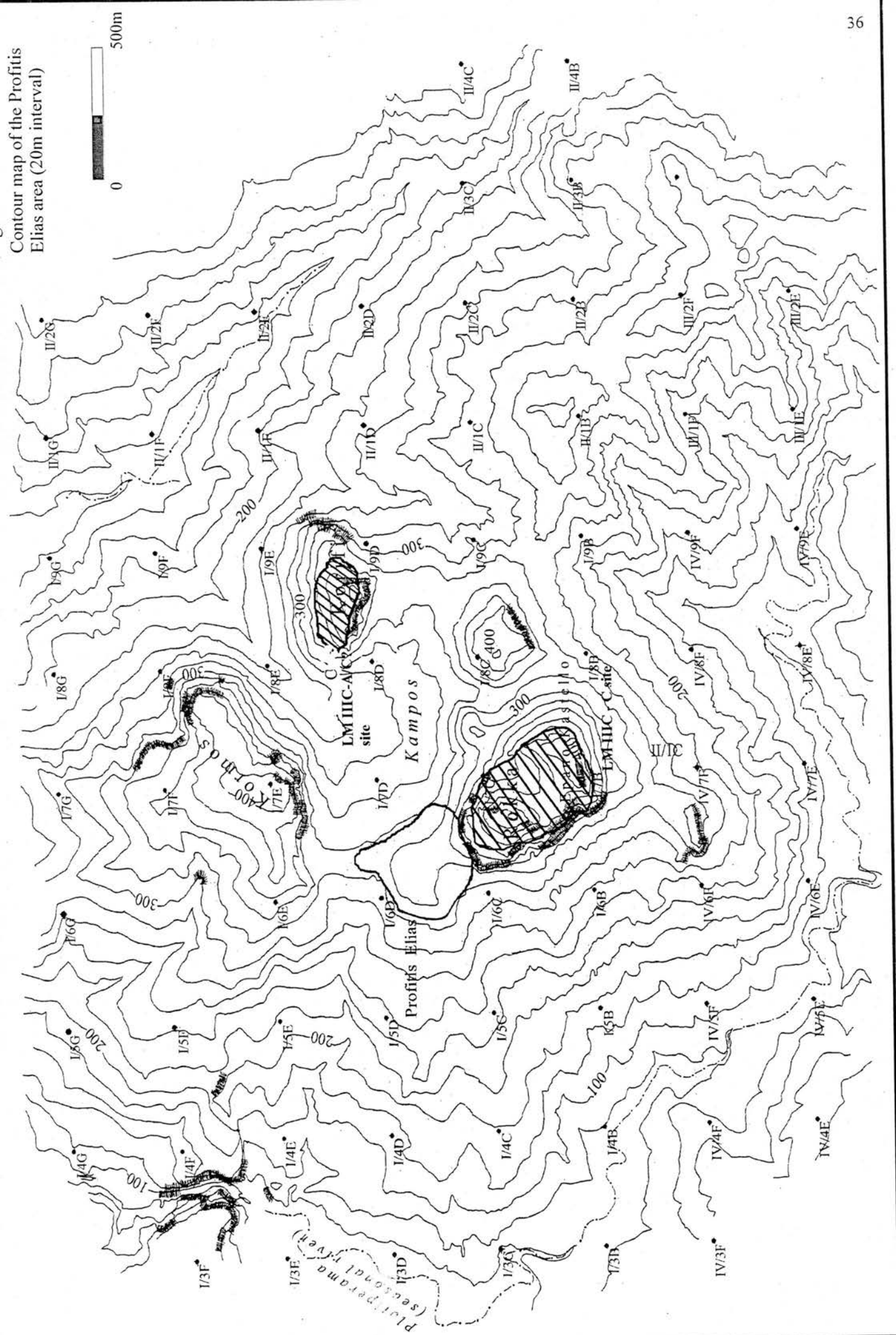


Figure 2.2-26  
Arable zoning in the Chamaizi Liopetra area

Contour map of the Profitis Elias area (20m interval)



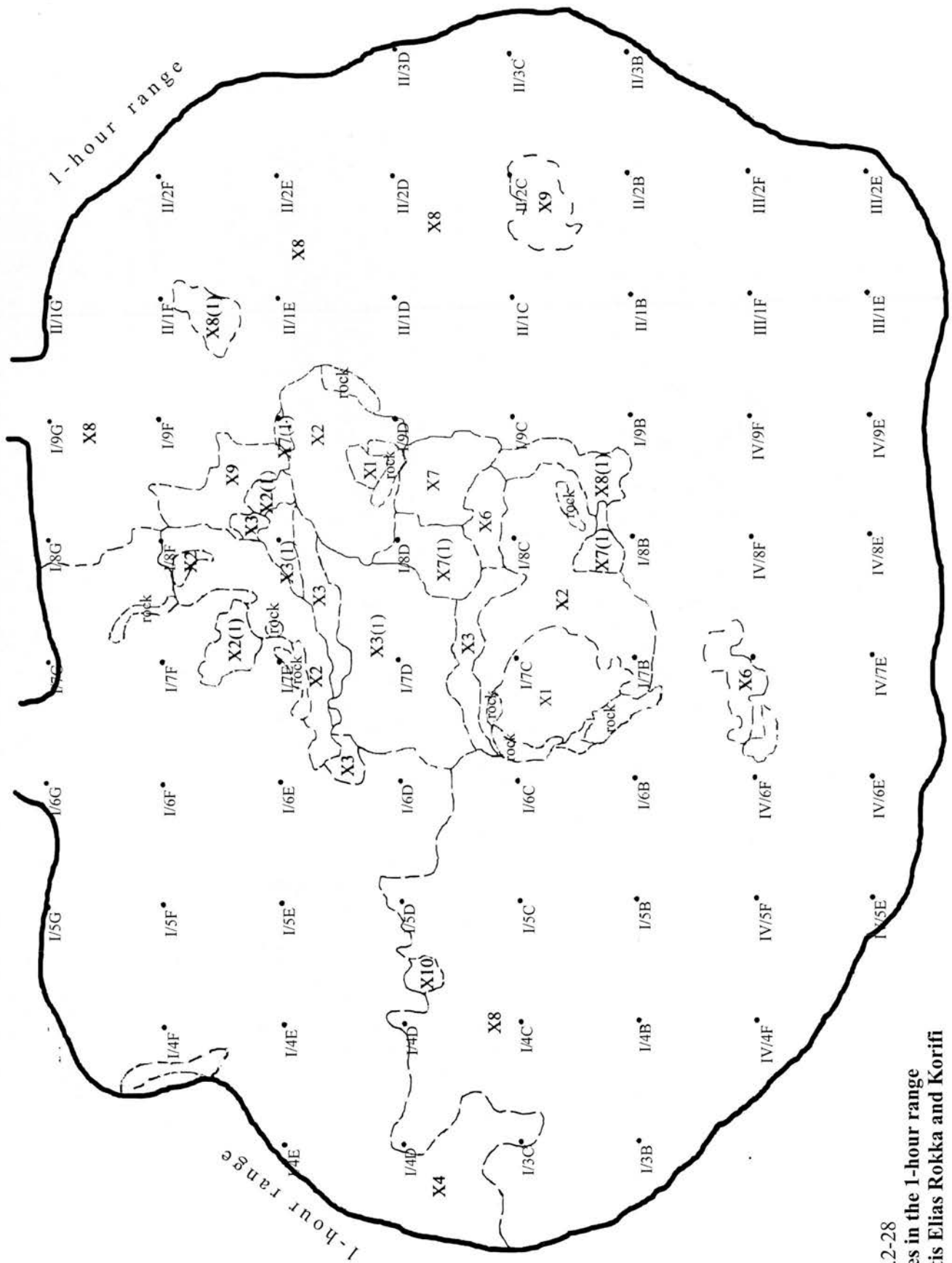


Figure 2.2-28  
Soil types in the 1-hour range  
of Profitis Elias Rokka and Korifi





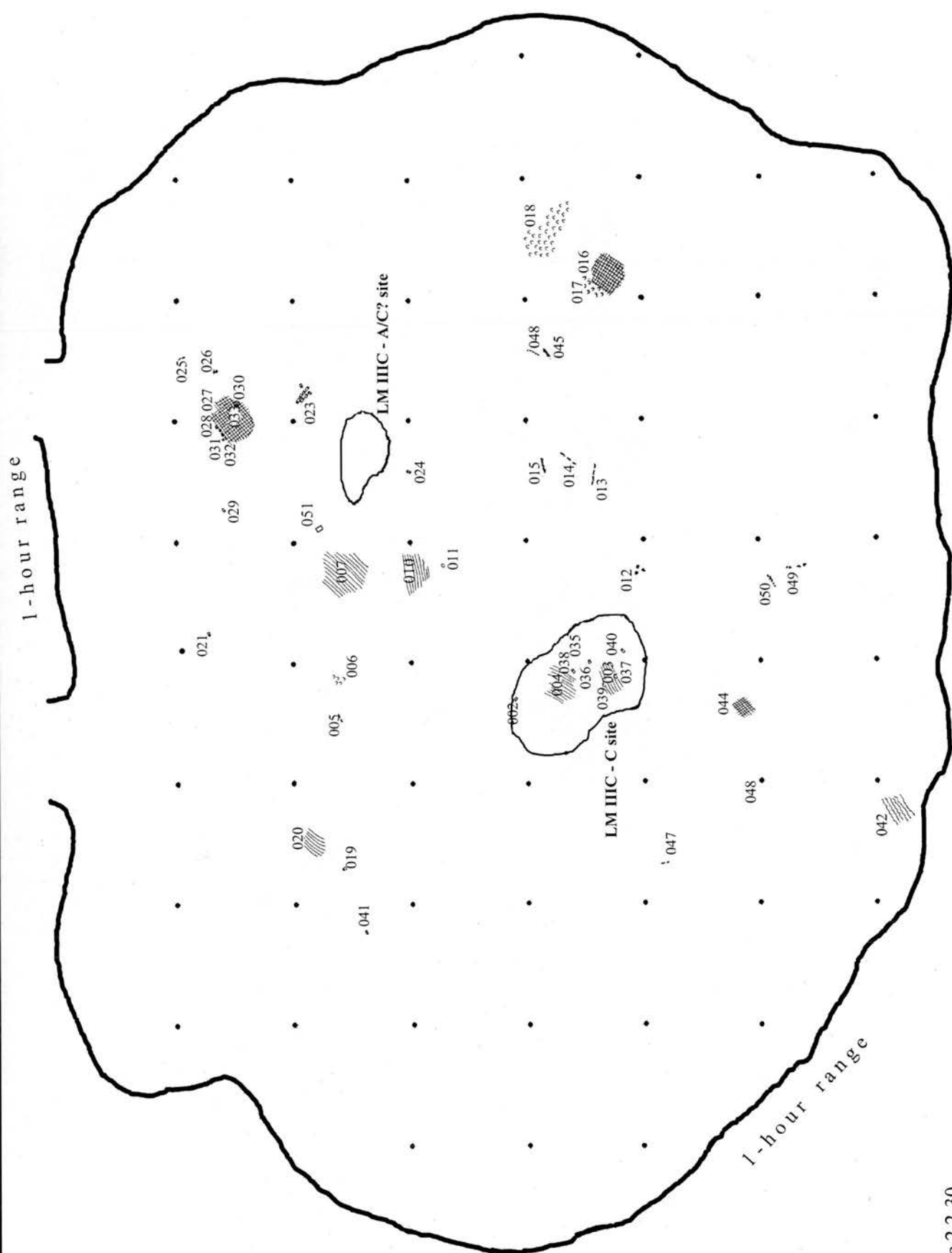
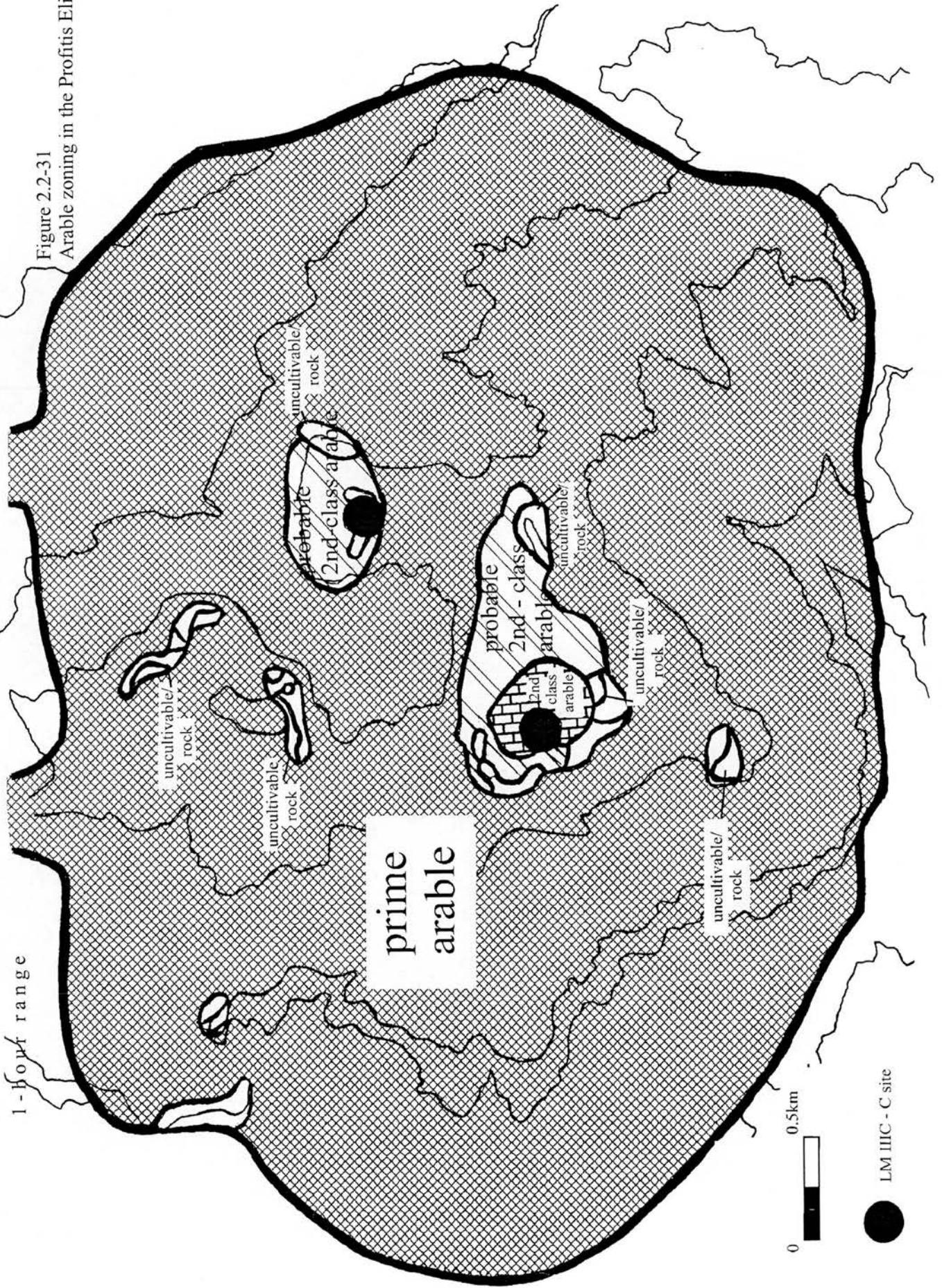


Figure 2.2-30  
Cultural features in the 1-hour range  
of Profitis Elias Rokka and Korifi

Figure 2.2-31

Arable zoning in the Profitis Elias area



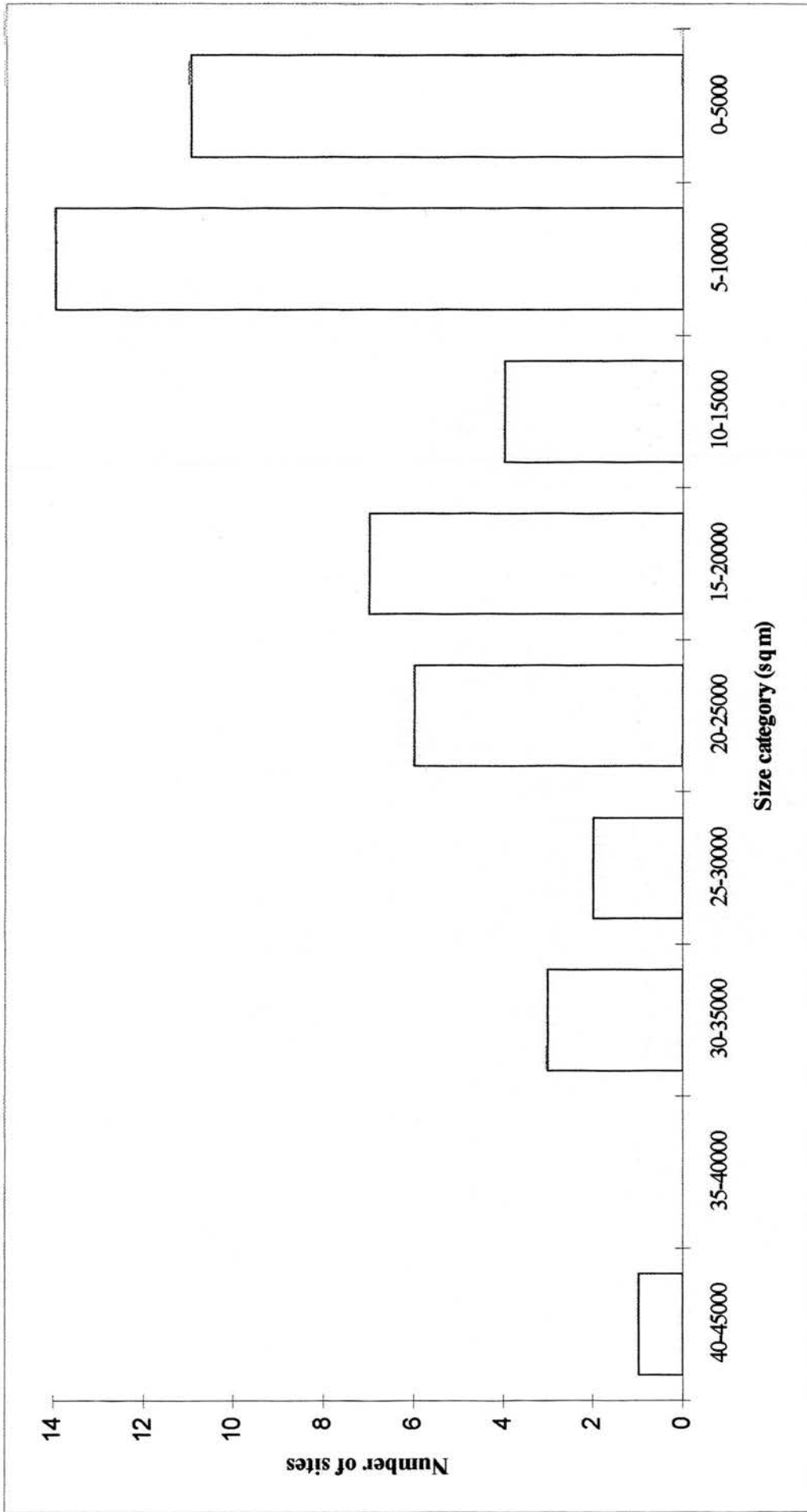
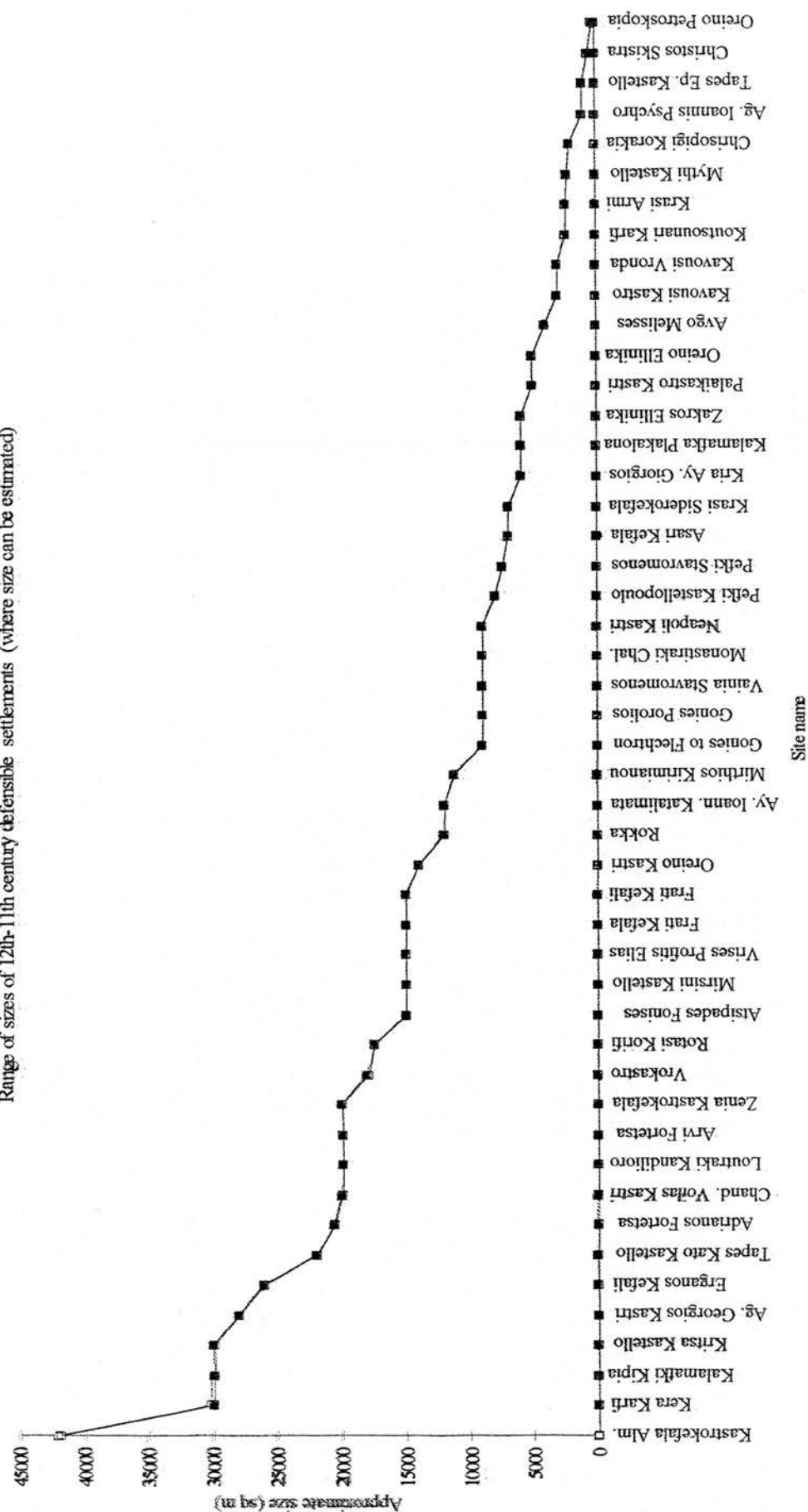


Figure 3.1-1  
Number of sites in each size category, for 12th-11th-century defensible settlements where size can be estimated

Figure 3.1-2  
Range of sizes of 12th-11th century defensible settlements (where size can be estimated)



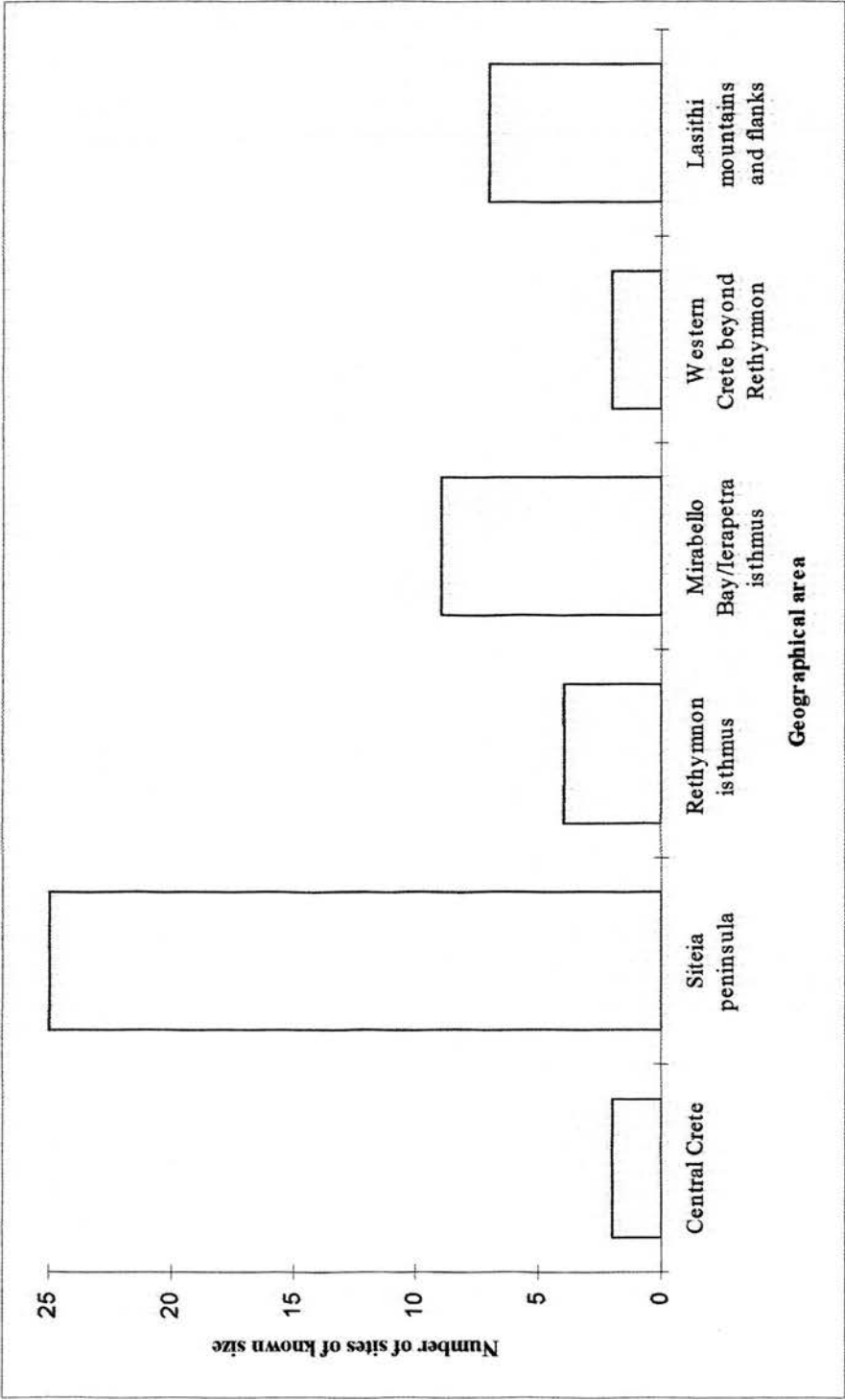


Figure 3.1-3  
Distribution by region of 12th-11th century defensible sites where size can be estimated  
(The regions are arbitrary, cannot be shown to have any political significance at the period in question, and are defined in order to show the bias of archaeological studies).



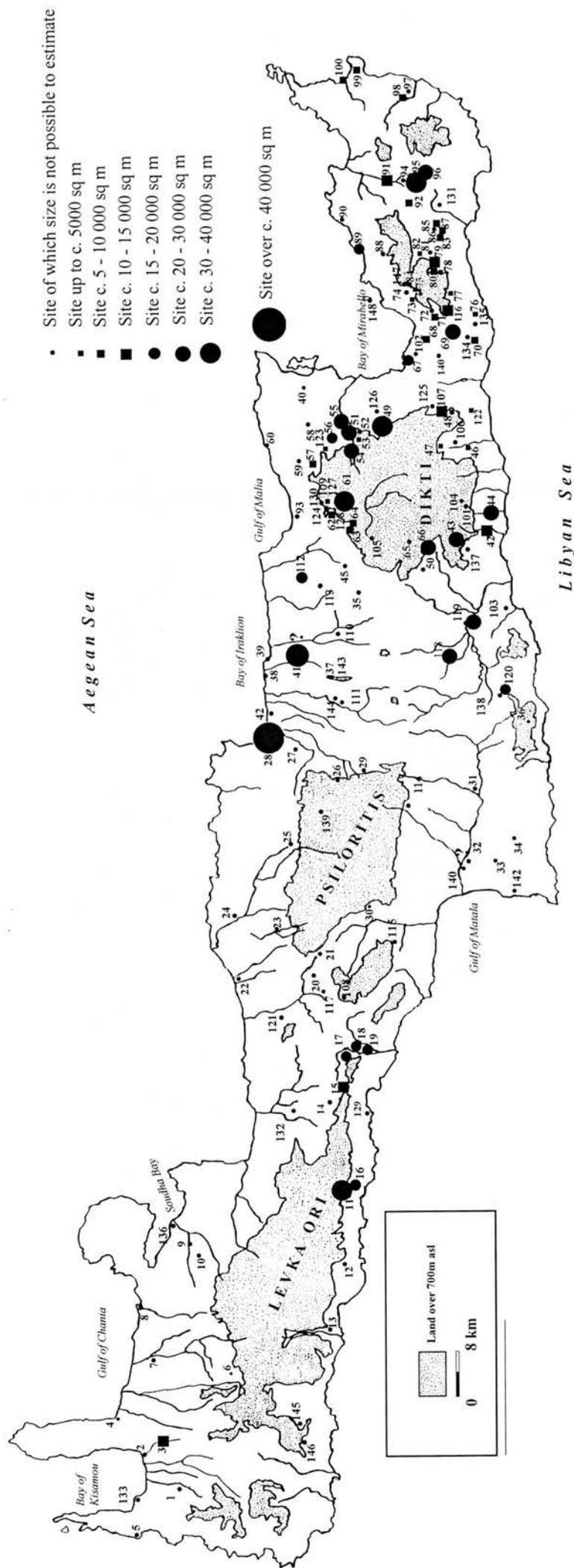


Figure 3.1-4  
 Map of sizes of 12th - 11th century sites (where size can be estimated)

Table 3.2-1 Bibliographic and contents information on 12th-11th century tombs in Crete (see notes at end of table)

Tomb	Bibliographic reference	No. of individuals	Date span now commonly attributed	Age/sex of burials	Dimensions (metres)	No. of pots of LM I/IIIC/SM date	No. and type of prestige items	Other finds	Looted/disturbed?	Funerary rite	Tomb type	Additional information on individual associations 1	Additional information on individual associations 2	Additional information on individual associations 3
<b>Knossos</b>														
Kefala tholos	Hutchinson 1956; Cadogan 1967	6-9	LM IIIC (first used in LM IA)	6 adults (skulls)	6 diameter	17	A range of bronze, gold and faience items, most likely to be from LM I use of the tomb - not fully published. Some - e.g. straight bronze pins - could be LM IIIC.	Several, probably of LM I date but some of which could be LM IIIC. Not fully published. Clay and steatite beads, steatite spindle-whorls, steatite seal-stone.	Some disturbance	Inhumation	Tholos (re-used)			
Ayios Ioannis Tomb IV	Boardman 1960	2?	SM-EPG 2 phases of use	?	1.5 x 0.85 x 1.35 x 1.4	7	4 of iron (pin, spearhead, sword blade) and bronze (ring). Other scraps of both metals.	?	Cut by an EPG tomb but not badly disturbed.	1 cremation. 1 inhumation?	Chamber			

Ayios Ioannis re-used tomb	Hood and Coldstream 1968	2	SM (first used in LM II)	1 adult M, 1 adult F	2.4 x 2.6	3	2 of bronze (long pins, one with ivory head)	0	Not	Inhumations	Chamber, re-used			
Upper Gypsades VIa	Hood, Huxley and Sanders 1959; 205-8	?	LM IIIC	?	?	4	?	?	Consider -ably disturbed	Inhumation?	Probably chamber			
Upper Gypsades VII	Hood, Huxley and Sanders 1959; 205-8	3	LM IIIC	More than 1	1.7 x 1.9	9	6-7 of iron (knife with bronze rivets), bronze (ring, 4 long pins), and amber (beads)	Clay beads, agate seal-stone, spindle-whorl	Not	Inhumations, 1 in lamax	Chamber	NW burial 2 pots, seal-stone, spindle-whorl, amber and other beads	E burial 2 pots bronze ring	Lamax inhumation Iron knife, bronze pins, 5 pots?
North Cemetery	See also Cavanagh 1996, Musgrave 1996										Chamber			
NC Tomb 2/SW	Coldstream and Catling 1996: 58, Figs 5, 13; Plate 114, 88	1	SM	1 adult M	2 chambers (1 x 1.3 and 1.03 x 1.66)	3	5 of iron (spearhead and socket, pin, knife and dirk) and bronze (pin frags)	Steatite seal-stone, goat horn core	R intrusions	1 cremation in pitthos	Chamber			
NC Tomb 16/SE	Coldstream and Catling 1996: 66, Figs 6, 15; Plate 124, 94	2	SM	1 adult, 1 infant	1.3 x 1.2	1	1 of iron (knife). Perhaps PGB-MG intrusive.	Steatite button	Fallen roof. E-MG intrusive material	Inhumations	Chamber			
NC Tomb 18/S	Coldstream and Catling 1996: 66, 70. Figs 6, 16; Plate 12, e-g	2	SM	1 adult, 1 adult M?	1.3 x 1.7	1	0	0	Not	Inhumations	Chamber			
NC Tomb 24	Coldstream and Catling 1996: 72. Figs 5, 17; Plate 14 a-b	1	SM/EPG	Adult	1.66 x 2.10	3	1 clear LM IIIC-SM of bronze (fibula)	Serpentine offcut, limestone mortar and basin	MG-O, R intrusions	Inhumation	Chamber			

NC Tomb 40	Coldstream and Catling 1996: 86-89, Figs 5, 6, 23; Plates 17-18	2-3	SM	Young adults	1.82 x 1.78	13	16 of gold (rosette, wire hoop) and iron (ring, numerous frags of up to 11 straight iron pins, fibula).	0	Oyster shell, incised bone attachment, 2 bone pins.	LO separate use phase, R intrusions	Inhumations	Chamber			
NC Tomb 98/SE	Coldstream and Catling 1996: 130-132, Figs 5, 34; Plate 24c	2-3	SM-EPG	?	2.86 x 2.4	5 SM	0	0	0	Cut by R feature, LG-EO intrusion (from a pithos burial) SM floor deposit undisturbed	Inhumations in lamakes (assuming lamax frags found are LM IIIC-SM)	Pit/ Pit-cave			
NC Tomb 112	Coldstream and Catling 1996: 162-3, Figs 6, 31; Plate 28, a-b	2	SM	Adult, 25-35	1.08 x 1.4	3-4	0	0	0	H disturbance in upper layers; otherwise apparently undisturbed	Inhumations, cremation (in amphora?)	Chamber			
NC Tomb 121	Coldstream and Catling 1996: 164-5, Figs 6, 39; Plate 28 d-g	3	SM	1 middle-aged M, 1 F under 25, 1 child under 6 (last two burials were interred first)	1.3 x 1.25	7	2 of bronze (fibulas)	1 glass bead, incised bone tube	Disturbance by later burial in dromos	Inhumations	Inhumations	Chamber	Adult M: 2 flasks and a stirrup-jar	Adult F and child: small oinochoe, flask, feeding bottle, juglet, Fibulae.	

NC Tomb 149	Coldstream and Catling 1996: 180-1. Fig. 41	1	SM	Adult M	1.28 x 0.66	?	?	?							
NC Tomb 153	Coldstream and Catling 1996: 181. Figs 5, 43; Plate 31e	1	Probably SM	Adult 25-35	1.16 x 0.61 (pit)	0	0	0							
NC Tomb 160	Coldstream and Catling 1996: 182-3. Fig 43; Plate 32 b-e	1	SM	Older adult male	1.10 x 0.64 (pit)	1	0	0							
NC Tomb 186	Coldstream and Catling 1996: 190-1. Figs 5, 43; Plate 274.	1	SM	Adult M	0.6 x 0.4 (burial chamber). Pit = 1 x1	1	4 of iron (knife, mud-dirk) and bronze (spearhead, shield-boss)	Whet-stone (of mud-stone); schist honing stone							
NC Tomb 200	Coldstream and Catling 1996: 191-5. Figs 5, 43, Plates 34-35e	1	SM	Young adult F or small M	0.7 x 0.7 (burial chamber) Pit (200-201) = 1.34 x 1.34	4	8-9 of bronze (wheel-shaped pin-head, small lump), gold (necklace, ring, gold leaf frag), ivory (comb), falence (3 beads), glass (3 beads).	Serpentine conulus							

NC Tomb 201	Coldstream and Catling 1996: 191-5, Figs 5, 43; Plates 34-35e	3	SM	1 adult M, 1 adult F, 1 child	0.54 x 0.5 (burial chamber) Pit (200- 201) = 1.34 x 1.34	0	At least 19 of bronze (4-sided stand, 5 arrow- heads, spearhead, shield-boss, large projectile point, strip, rivet) iron (knife, 2 straight pins), gold (ring) and ivory (mounting, 14 frags), numerous frags from a boar's- tusk helmet	0	Not	Cremations	Pit-cave		
NC Tomb 208 SW	Coldstream and Catling 1996: 199-200, Figs 5, 44	1	SM	?	0.8 x 0.6 (pit)	1 (neck- handled amphora) used as crem- ation vessel?)	3 of iron (knife, pin, sword/dirk) are probably SM.	?	G-R intru- sions	Cremation?	Uncertain type, probably a pit- cave.		
NC Tomb 282	Coldstream and Catling 1996: 230, Figs.3, 48; Plate 38b	Probably 1	SM (on basis of grave type)	?	1.35 x 0.72 (pit)	?	?	?	Thor- oughly dist- urbed/ looted	?	Shaft		
Fortessa 1967/5	Coldstream and Catling 1996: 287, Fig 55, Plate 5c	At least 1	SM	1 child	2.4 x 1.8	2	?	?	LG/EO use phase. R intru- sions. SM deposit signifi- cantly disturbed	Inhumation	Chamber		



Fortesa 1867/14	Coldstream and Catling 1996; 289, Fig 55,	At least 1	SM-PG-G re-use/disturbance)	?	2 x 1.8 (pit)	1	?	?	?	Thoroughly disturbed. PG-G intrusions in fill	?	Shaft		
Fortesa Tomb II	Brook 1957: 8-10, Plates 3, 131	At least 1	SM - EPG	?	2.5 diameter	20	1 of iron (straight pin)	Clay beads	Partly disturbed/robbed	Cremations assumed	Chamber			
Fortesa Tomb VI	Brook 1957: 11-15, Plates 4-7, 133,	3-4?	SM-PG	?	2.25 x 1.75	7 including pictorial krater, containing probably later cremation (SM/PG), and a bird and askos	None clearly associated with SM material	None clearly associated with SM material	Tomb used into PG	Cremation in vessels likely	Chamber			
<b>Other sites</b>														
Karfi Ta Minnata (TM) Tomb 1	Pendlebury et al 1938: 101, Plate XXVIII, L	?	LM IIIC-SM	?	1.8 x 2	5 min	1 of bronze (straight pin)	1 steatite, 2 ceramic spindle-whorls	Partly disturbed G re-use	Inhumations in lamiax	Tholos			
Karfi TM Tomb 2	Pendlebury et al 1938: 101, Plate XXXII, 3	3	LM IIIC-SM	?	1.8 x 1.6	2 min	0	Incised bone frag, 2 animal figurines	Not	Inhumations	Tholos			
Karfi TM Tomb 3	Pendlebury et al 1938: 102, Plates XII, XXV, 4; XXVIII, 1	1	LM IIIC-SM	?	1.8 x 1.6	2 min	1 of bronze (straight pin)	0	Partly disturbed but most of assemblage probably intact	Inhumation	Tholos	0		

Karfi TM Tomb 4	Pendlebury et al 1938: 103, Plates XII: XXVI, 1, 2	5	LM IIIC- SM	?		c. 2 diameter	11 min	4 of bronze (2 fibulae, 1 ring, 1 needle) and iron (frags)	? ?	Frag of 3 animal figurines	Looted	Inhumation in lamakes	Tholos			
Karfi TM Tomb 5	Pendlebury et al 1938: 103, Plates XII: XXV, 5	?	LM IIIC- SM	0		1.8 x 1.6	2 min		?		Looted/ damaged	0	Tholos			
Karfi TM Tomb 6	Pendlebury et al 1938: 103, Plates XII: XXV, 5	?	LM IIIC- SM	0		1.5 diameter	3 min		?		Looted	Inhumation in lamax	Tholos			
Karfi TM Tomb 7	Pendlebury et al 1938: 104-5, Plates XII, XXVI, 3, 4	2	LM IIIC- SM	?		2 x 2	2 min	1-2 of bronze (discs)		Bone needle	Partly damaged	Inhumations	Tholos			
Karfi TM Tomb 8	Pendlebury et al 1938: 104-5, Plates XII: XXVI, 3, 4	3	LM IIIC- SM	?		2.2 diameter	5 min (if outside deposit included). Clay stand frag from this deposit	12 of bronze (3 rings, 3 hair-rings, and 2 fibulae, unident- ified tool, small disks) and iron (needle, handle - if deposit adjacent to and outside the tomb is included)	Bone bead, 1 animal and 2 human figurines from the outside deposit.	Slightly disturbed ?		Inhumations	Tholos			
Karfi TM Tomb 9	Pendlebury et al 1938: 105-6; Plates XIII: XXVI, 5, 6	4	LM IIIC- SM	?		1.5 x 1.8	2 min	3 of bronze (long pins)	0		Not	Inhumations	Tholos			
Karfi TM Tomb 10	Pendlebury et al 1938: 105-6; Plates XIII: XXVI, 5, 6	4	LM IIIC- SM	?		1.4 x 1.4	2 min	1 of bronze (long pin)	Sheep teeth		Not	Inhumations	Tholos			

Karfi TM Tomb 11	Pendlebury et al 1938: 105-6, Plates XIII: XXVI, 5, 6	2	LM IIIC- SM	?	2.2 x 2	8 min including bird askos, anthropo- morphic rhyton top	4-5 of bronze (fibula), iron (2 blade frags, simple fibula), rock crystal (piece)	Steatite spindle- whorl, animal teeth	Slightly disturbed	Inhumations	Tholos			
Karfi TM Tomb 12	Pendlebury et al 1938: 105-6, Plates XIII: XXVI, 5, 6	4	LM IIIC- SM	?	1.2 x 2	1 min	0	Steatite spindle- whorl	Not?	Inhumations	Tholos			
Karfi TM Tomb 13	Pendlebury et al 1938: 105-6, Plates XIII: XXVI, 5, 6	0	LM IIIC- SM	?	0.6 diameter	1 min	3 of bronze (2 fibulae, 1 hair-ring)	0	Dist- urbed	Presumably inhumation	Tholos			
Karfi TM Tomb 14	Pendlebury et al 1938: 107, Plates XIII: XXVI, 5, 6	1	LM IIIC- SM	?	1.8 diameter	9 min	0	Steatite spindle- whorl	Not?	Inhumation	Tholos			
Karfi TM Tomb 15	Pendlebury et al 1938: 107, Plates XIII: XXVI, 5, 6	2	LM IIIC- SM	?	2 x 1.6, Addi- tional extension 1 x 1	2 min	?	?	Dist- urbed. Prob. later use (A)	Inhumations	Tholos			
Karfi TM Tomb 16	Pendlebury et al 1938: 107, Plates XIII, XXVII, 1	4	LM IIIC- SM	?	2.2 x 1.5	6 min	0	0	Slightly disturbed ?	Inhumations	Tholos, built together with TM/17			
Karfi TM Tomb 17	Pendlebury et al 1938: 107, Plates XIII, XXVII, 1	3	LM IIIC- SM	?	2 x 1.6	11 min	2 of bronze (ring, simple fibula)	Various animal bones (equid, sheep/ goat, cattle)	Slightly disturbed	Inhumations	Tholos (see above)			
Karfi Astividero (AV) Tomb 1	Pendlebury et al 1938: 108, Plates XIII: XXVII, 2	1	LM IIIC- SM	?	1.6 x 1.6	3 min	0?	Steatite spindle- whorl	Not	Inhumation	Tholos			
Karfi Astividero (AV) Tomb 2	Pendlebury et al 1938: 108, Plate XIII	?	LM IIIC- SM	?	1.8 x 1.4	3 min	0	0	Dist- urbed	Inhumation?	Tholos			

Karfi Astividero (AV) Tomb 3	Pendlebury et al 1938: 108, Plate XIII	1+	LM IIIIC- SM	?	1.8 diameter	6 min	0	0	Disturbed	Inhumations	Tholos			
Karfi Astividero (AV) Tomb 4	Pendlebury et al 1938: 108-9, Plates XIII, XXVII, 3-5	1	LM IIIIC- SM	?	1.8 x 1.4	4 min	0	0	Not	Inhumations	Tholos			
Kavousi Vronta Tholos 1	Boyd 1901: 132; Plates 1, 2, Gesell, Day and Coulson 1983: 396, Fig 4	At least 1 (no remains found)	SM-PG	?	1.64 x 1.68	2 clearly SM	?	?	Looted/ excavated without full record	Inhumation?	Tholos			
Kavousi Vronta Tholos 2	Boyd 1901: 132, Plates 1, 2, Gesell, Day and Coulson 1983: 396, Fig 4	3	SM-PG	?	2.6 x 2.8	1 clear SM (lentoid flask)	2 of bronze (rings)	2 clay spindle- whorls	Excavated without full record	Inhumations	Tholos			
Kavousi Vronta Tholos 3	Boyd 1901: 132, Plates 1, 2, Gesell, Day and Coulson 1983: 398, Fig 4	At least 1 (no remains found)	SM-PG	?	Not measured	?	?	?	Completely looted. Excavated without record	Inhumations	Tholos			
Kavousi Vronta Tholos 4	Boyd 1901: 132, Plates 1, 2, Gesell, Day and Coulson 1983: 398-9; Fig 4	4	SM-PGB	?	3.2 x 2.6	4 including bird askos and lentoid flask	At least 2-3 of bronze (simple fibulae). Bronze bracelet, possibly SM	Poss. SM steatite spindle- whorl, soap- stone spindle- whorl	Not	Inhumations	Tholos			
Kavousi Vronta Tholos 5	Boyd 1905: 132, Plates 1, 2, Gesell, Day and Coulson 1983: 401; Figs 5, 6	At least 1 (no remains found)	SM-PG	?	1.8 x 1.8	1 possible	?	?	Found empty except for a few sherds	Inhumations ?	Tholos			
Kavousi Vronta Tholos 6	Boyd 1901: 132, Plates 1, 2, Gesell, Day and Coulson 1983: 401	At least 1 (no remains found)	SM-PG	?	c. 2.8 diameter	2 possible	?	?	Found empty except for a few sherds	Inhumations ?	Tholos			

Kavousi Vronta Tholos 7	Boyd 1901: 132; Plates 1, 2, Gesell, Day and Coulson 1983: 401; Fig 6	At least 1 (no remains found)	SM-MG	?	Not measured	1	3 or more of bronze (fibulae, frags) and iron (frags) probably LM IIIC- SM	Soap- stone spindle- whorl	Very poorly pres- erved	Inhumations ?	Tholos			
Kavousi Vronta Tholos 8	Boyd 1901: 132; Plates 1, 2, Gesell, Day and Coulson 1983: 401-3, Fig 6	At least 1 (no remains found)	SM-PG	?	Not measured	1	2 or more of bronze (fibulae)	?	Very poorly pres- erved	Inhumations ?	Tholos			
Kavousi Vronta Tholos 9	Boyd 1901: 132; Plates 1, 2, Gesell, Day and Coulson 1983: 403-4, Fig 8	3	SM-EG	?	Not measured	3 Include bird askos and lentoid flask	Apparently 0 or very few	3 stone spindle- whorls	Cleared by land- owner	Inhumations	Tholos			
Kavousi Vronta Tholos 10	Boyd 1901: 132; Plates 1, 2, Gesell, Day and Coulson 1983: 405, Fig 7, 8	At least 1 (no remains found)	SM-PGB	?	Not recorded. Approx the same as other Vronta tholoi	At least 1	?	?	Almost com- pletely looted	Inhumations ?	Tholos	dog burials in fill		

Vrokastro Chamber Tomb I Karakovilia	Hall 1914: 95-8; Desborough 1952: 262-8	6	LM IIIC/SM- G	Includes at least 1 child	3 x 2	3 possible	At least 1 of iron (knife), of poss. LM IIIC-SM. Large PG and later assemblage including many iron tools and weapons gold rings, a bronze tripod stand, faience beads. Some of these may be LM IIIC-SM	0 of clear LM IIIC-SM date	Not	Inhumations and cremations	Chamber			
Vrokastro Chamber Tomb II Karakovilia	Hall 1914: 98-9; Desborough 1952: 262-8.	24	LM IIIC/SM- PG	?	2.04 x 1.7	1 possible	1 of iron (simple fibula) probably LM IIIC- SM	0 of clear LM IIIC-SM date	Not	Inhumations	Chamber			
Vrokastro Chamber Tomb III Karakovilia	Hall 1914: 99; Desborough 1952: 262-8	7	LM IIIC/SM- PG	?	1.76 x 1.34	1	Up to 16 of bronze (disk, saw fragments, 3 rings, bracelet, 9 straight pins, bead) and rock- crystal (2 pendants) all probably LM IIIC- SM	Steatite frag., steatite bead both poss. LM IIIC-SM	Dist- urbed: some pots in frags	Inhumations	Chamber			



Vrokastro Chamber Tomb IV Karakovilia	Hall 1914: 99- 100; Desborough 1952: 262-8	several	LM IIIC/SM- PG	?	1.8 x 1.54	Max. 5	Up to 4 of bronze (long pin, 3 rings, 2 fibulas) Faience (beads) probably PG)	What- stone, probably LM IIIC-SM, Several MM-LM heir- looms: inscribed steatite disk, carnelian seal- stone, steatite bead? Some of these are likely to have been prestige items	Not	Cremations (some in pots); inhumations	Chamber			
Vrokastro Chamber Tomb V Koprantes	Hall 1914: 100-1; Desborough 1952: 262-8	several	LM IIIC/SM- PG	?	1.66 x 2.09	Min. 9. Includes 2 lentoid flasks, 1 bird- headed ladle	3 of iron (knife) and bronze (2 hoop earrings), possible LM IIIC- SM Faience (beads) probably PG.	Obsidian chips (prob- ably EM- MM). Re-used?	Looted	Cremations - bones found in and out of pots	Chamber			

Vrokastro Chamber Tomb VI Koprances	Hall 1914: 103-4; Desborough 1952: 262-8	3	LM IIIC/SM-PG	?	Not recorded	5 including 2 bird askoi	3-4 of iron (ring, knife with bronze rivets (tang only preserved) and bronze (ring, fibula which may be EPG?)	0	Not	Inhumations	Chamber		
Vrokastro Chamber Tomb VII Koprances	Hall 1914: 104-5; Desborough 1952: 262-8	1-several	LM IIIC/SM	?	2.24 x 1.59	5	2 of iron (spear-end and bronze (ring)	0	Not	Inhumations	Chamber		
Phaistos road construction (included here alongside other tombs near Phaistos)	Levi 1955:159; Desborough 1964: 183-4; Rocchetti 1970: 46-54; Kanta 1980:100	?	SM-PG	?	Not published	13	5 of bronze (2 pins, 3 fibulae)	Stone bead	Not?	Inhumations ?	Tholos	1 stearite button	
Phaistos Liliana Tomb A	Savignoni 1904: 637; Kanta 1980: 100	5	LM IIIC-SM	All adults	Not published	22	1 of bronze (ring)	Clay beads	Not	Inhumations	Chamber		
Phaistos Liliana Tomb B	Savignoni 1904: 637; Kanta 1980: 100	3?	LM IIIC-SM	All adults	Not published	2	0	0	Not	Inhumations in lamakes	Chamber		
Phaistos Liliana Tomb C	Savignoni 1904: 637; Kanta 1980: 100	2+	LM IIIC-SM	All adults	Not published	1	0	0	Disturbed	Inhumation?	Chamber		
Phaistos Liliana Tomb D	Savignoni 1904: 637; Kanta 1980: 100	4	LM IIIC-SM	3 adults, 1 child cremation in pot	Not published	16	1 of bronze (ring)	Clay beads, bronze needle, animal figurine	Not	Inhumation in lamakes/cremation	Chamber	Animal figurine together with child cremation in pot	
Phaistos Liliana Tomb E	Savignoni 1904: 637; Kanta 1980: 100	3	LM IIIC-SM	All adults	Not published	4	0	Clay beads	Not	Inhumation in lamakes	Pit		
Phaistos Liliana Tomb F	Savignoni 1904: 637; Kanta 1980: 100	1	LM IIIC-SM	All adult	Not published	0	0	0	Not	Inhumation in lamax	Pit	0	

Phaistos Liliانا Tomb G	Savignoni 1904: 637; Kanta 1980: 100	1	LM IIIC-SM	All adult	Not published	0	0	0	0	Not	Inhumation in lamax	Pit	0		
Phaistos Liliانا Tomb H	Savignoni 1904: 637; Kanta 1980: 100	1	LM IIIC-SM	All adult	Not published	0	0	0	0	Not	Inhumation in lamax	Pit			
<i>Single tombs/groups</i>															
Alsipades group of burials	Petroulakis 1915; Kanta 1980: 209	10 or more individuals	LM IIIC-SM	children	No recorded structures	Numerous - not recorded. Include bird askos.	?	?	?	Excavated without full record	Cremations in vessels (pyxides and amphorisko)	Vessel			
Afrati, stou Kofina tou Kefali	Halbherr 1901: 283; Kanta 1980: 75; Kanta and Kourtsou 1998	?	LM IIIC-SM/PG	?	1.9 x 1.65	? Include bird askos	? At least 1 of bronze (ring) Clay rod tripod	Stone spindle-whorl	Looted		?	Tholos			
Chalasmeno tholos A	Coulson and Tsipopoulou 1994: 86-91	5	LM IIIC	1 adult M, 1 adult F, 1 young adult F, 1 unknown adult, 1 unknown subadult	1.6 diameter	At least 10	1 of bronze (corroded pieces)	2 steatite spindle-whorls	Not		Inhumations	Tholos			
Dieros Tomb 1D	van Effenterre 1948: 17; Kanta 1980: 133	5	LM IIIC-SM	?	2.1 x 1.75	12 min	0	0	0	Not	Inhumations	Tholos			
Erganos Tomb '1' (my number)	Halbherr 1901: 271-7; Plate 6	6	LM IIIC-G	4 adult M, 2 adult F	1.3 diameter	7 including ossuary with pictorial decoration	0	0	0	Not	Inhumations, 1 in ossuary	Tholos			
Erganos Tomb '2' (my number)	Halbherr 1901: 278-9; Plate 6	3	LM IIIC	?	1.7 diameter	1	0	0	0	Not	Inhumation	Tholos			
Erganos Tomb '3' (my number)	Halbherr 1901: 279; Plate 6	0	LM IIIC	?	1.9 diameter	0	0	0	0	Looted	Inhumation?	Tholos			

Kritsa LM IIIC chamber tomb	Kanta 1980: 134-9, Platon 1951: 444-5	3	early LM IIIC	At least 1 adult	Not published	14 (15 including burial basin)	0	Potter's wheel	Not	2 cremations in pyxides, 1 inhumation in basin	Chamber			
Moulana A	Xanthoudides 1904; Kanta 1980: 175	2	LM IIIC	Adults	2.42 x 1.82	7 (including pictorial krater used as cremation vessel and lentoid flask)	15 of bronze (5/6 vessels, 3 swords, 2 spearheads, 2 fibulae, 1 pin, several plaques)	0	Not	Inhumation and cremation	Tholos			
Moulana B	Xanthoudides 1904; Kanta 1980: 175	2	LM IIIC	1 adult M. 1 unknown adult	2 x 1.97	4	11-12 of bronze (3 disks/shield-bosses, 2 swords, 2 spear-heads, iron (frag) and gold (ring and face-mask), ivory (frag))	0	Not	Inhumations, 1 in larnax	Tholos			
Mirsini Tomb A	Platon 1960a; Kanta 1980: 163-73	?	LM IIIA-early IIIC	?	Not published	4	?	?	Disturbed	Inhumation	Chamber			
Mirsini Tomb B	Platon 1960a; Kanta 1980: 163-73	?	LM IIIA-early IIIC	?	Not published	1	?	?	Not	Inhumation	Chamber			
Mirsini Tomb IA	Platon 1959; Kanta 1980: 163-73	?	LM IIIA-early IIIC	?	Not published	1	?	?	Disturbed	Inhumation	Chamber			

Milatos Tomb 3	Xanthoudides 1921; Kanta 1980: 125-8	4	Late LM IIIb/early LM IIIC	All adults	2.9 x 2.65	5 or more	Up to 6 of bronze (2 knives and several tools) and 'glass paste' (beads).	2 seal-stones (heir-looms?) which may have had some prestige value. Finds not specified between Tombs 3 and 4	Not	Inhumations in lamakes	Chamber			
Milatos Tomb 4	Xanthoudides 1921; Kanta 1980: 125-8	2	Late LM IIIb/early LM IIIC	All adults	2.3 x 1.5	5 or more	See above	See above	Not	Inhumations in lamakes	Chamber			
Phatsi Tomb III	Davaras 1972b; Tsipopoulou 1997; Kanta 1980: 176.	More than 1 - remains not quantified	'SM'-PG	?	2.2 x 1.65	3 including 2 bird askoi, lentoid flask	0 of clear SM date	2 lentoid seal-stones (heir-looms), possibly associated with the SM burials. May have had some prestige value	Looted	Inhumations ?	Chamber			
Phatsi Tomb IV	Davaras 1971, 1972b; Tsipopoulou 1997; Kanta 1980: 176	More than 1 - remains not quantified	'SM'-PG	?		4 including bird askos, krater	0 of clear SM date	0 of clear SM date	Not? Excavated without full record	Inhumations ?	Chamber			

Phatsi Tomb V	Davaras 1971, 1972b; Tsipopoulou 1997; Kanta 1980: 176	More than 1 - remains not quantified	'SM'-PG	?	2.1x 2.1	3 including krater. Early Cypriot III heirloom bowl deposited at unknown point in the tomb's use span	Not clear. At least 2 of iron (knives) and rock crystal (bead frag) may be of SM date	0 of clear SM date	Not? Excavated without full record	Inhumations ?	Chamber		
Praisos Fotoula	Platon 1960b: 302; Platon and Davaras 1960: 514-5; Kanta 1980: 179-80	3	LM IIIC	?	4.5 x 3	6 min. including pyxis containing cremation	At least 6 of bronze (pin, bronze-plated wooden vessel, spearhead) and gold (ring, ivory/gold handle, plate frag)	0	Not	Inhumations in lamax/ simple contracted Cremation in pot	Tholos	Inhumation in lamax associated with gold ring, ivory/gold handle, gold plate frag. and cremation in pyxis	Simple inhumation associated with 2 stirrup jars
Tylissos	Hatzidakis 1921: 82-6; Kanta 1980: 12-13	3	LM IIIB-C	?	?	3	?	?	?	1 cremation?, 2 inhumations, all in lamakes	Chamber		
Vasiliki tomb	Seager 1906:129-32; Plate 30; Kanta 1980: 146; Desborough 1964: 176-7	1	LM IIIC		?	3 including lentoid flask	3 of gold (pendant), bronze (dagger), and carnelian (beads)	0	Not	Inhumation in lamax	Tholos		



Veni tholos	Tegou in Stampolidis and Karatsou 1998: 184	Unpubl- ished	SM	Unpubl- ished	Unpubl- ished	Unpubl- ished	Unpubl- ished	1 of bronze (amphoroid krater) - other finds unpubl- ished	Unpubl- ished	Unpublis- hed	Cremation?	Tholos			
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# Notes

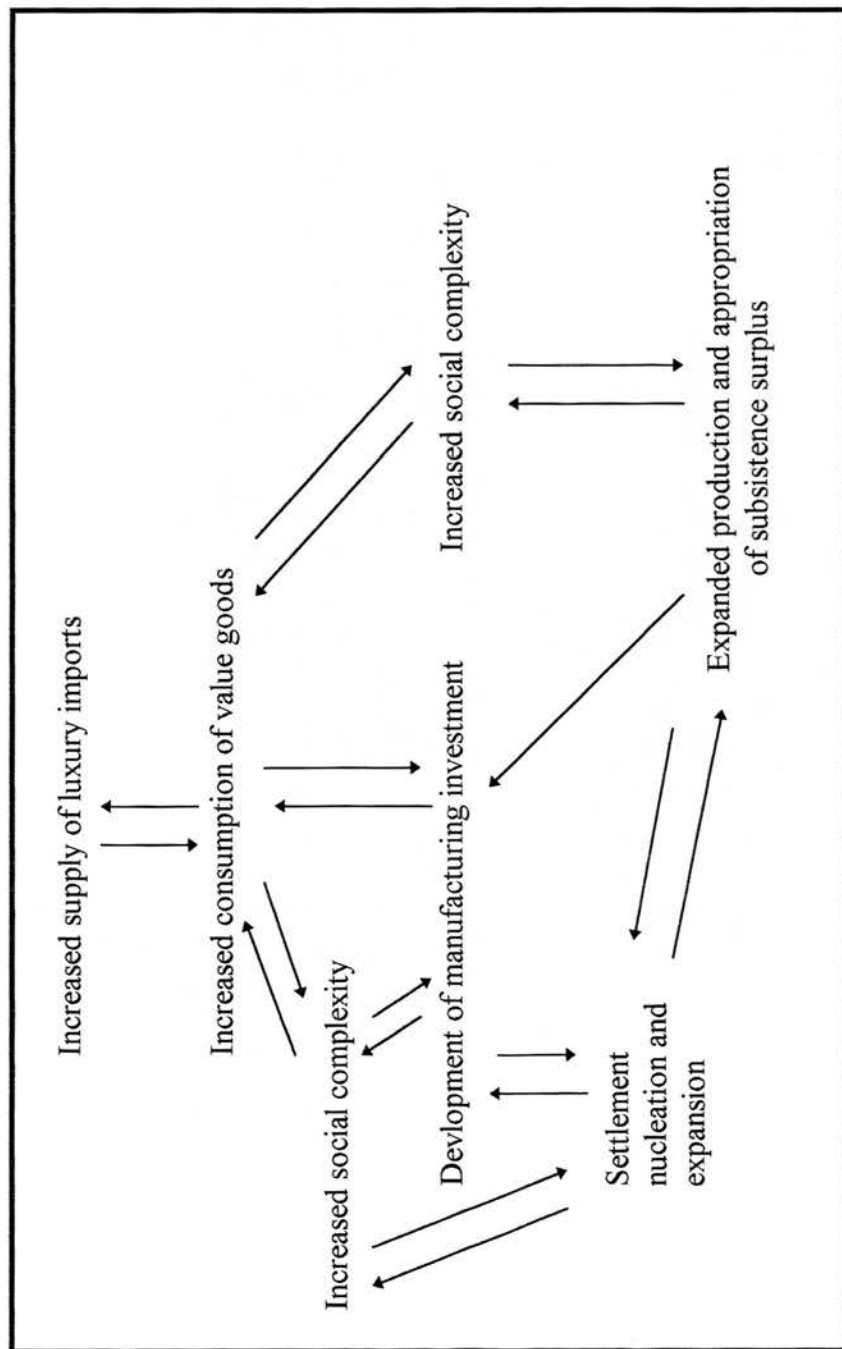
? indicates that information about this category of find was not recovered or published, through disturbance of tomb or inadequate recording/publication. 0 indicates that as far as known the category of item in question was never present in a tomb.

Where there is multi-period use of tombs, details of pottery and other finds later than SM are not given. However, the full number of burials in each tomb is always indicated where the number of burials belonging to a single period cannot be easily estimated.

Prestige goods are identified on the criteria discussed in Chapter 3.2. Ceramic vessels with possible prestige attributions are mentioned in the column for pottery. Faience and glass beads probably should be considered as components of prestige items.

Figure 3.2-1

Model of relationships between external exchange contacts and economic/sociopolitical development, 10th-century Crete



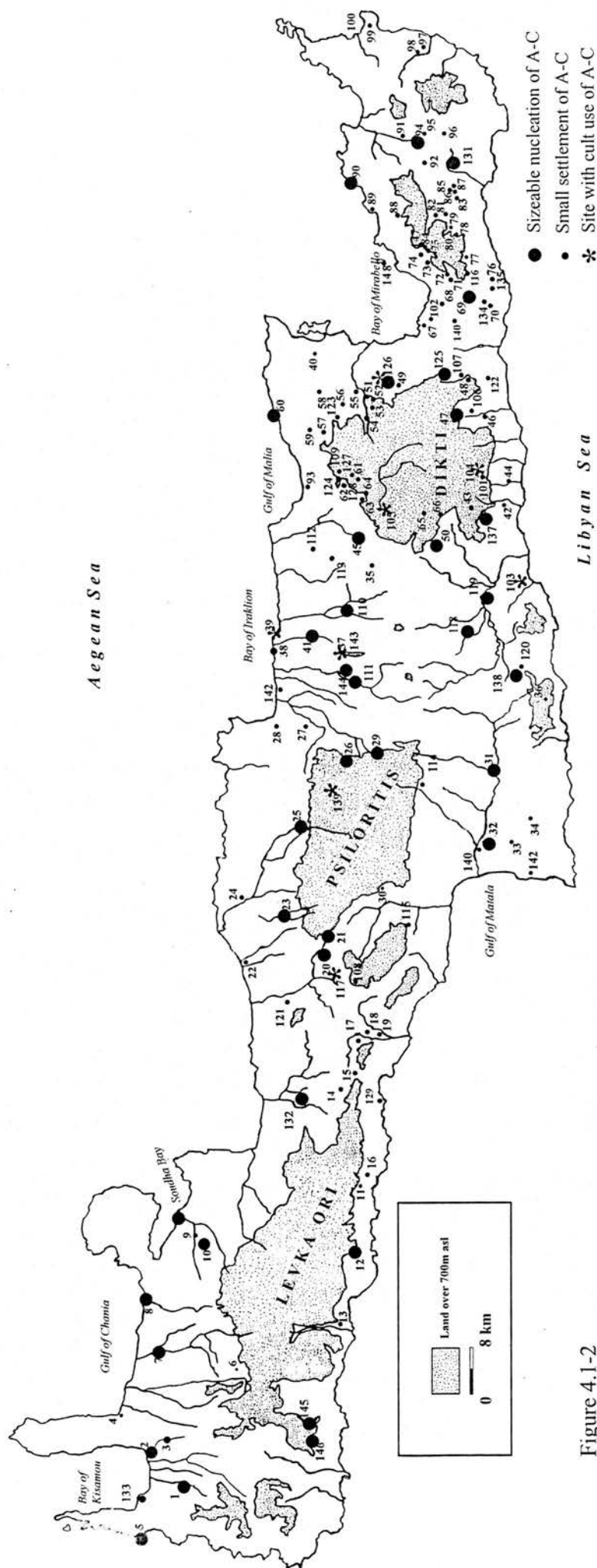


Figure 4.1-2  
Settlement and cult sites shown on Figure 4.1-1 where use continues  
in A-C

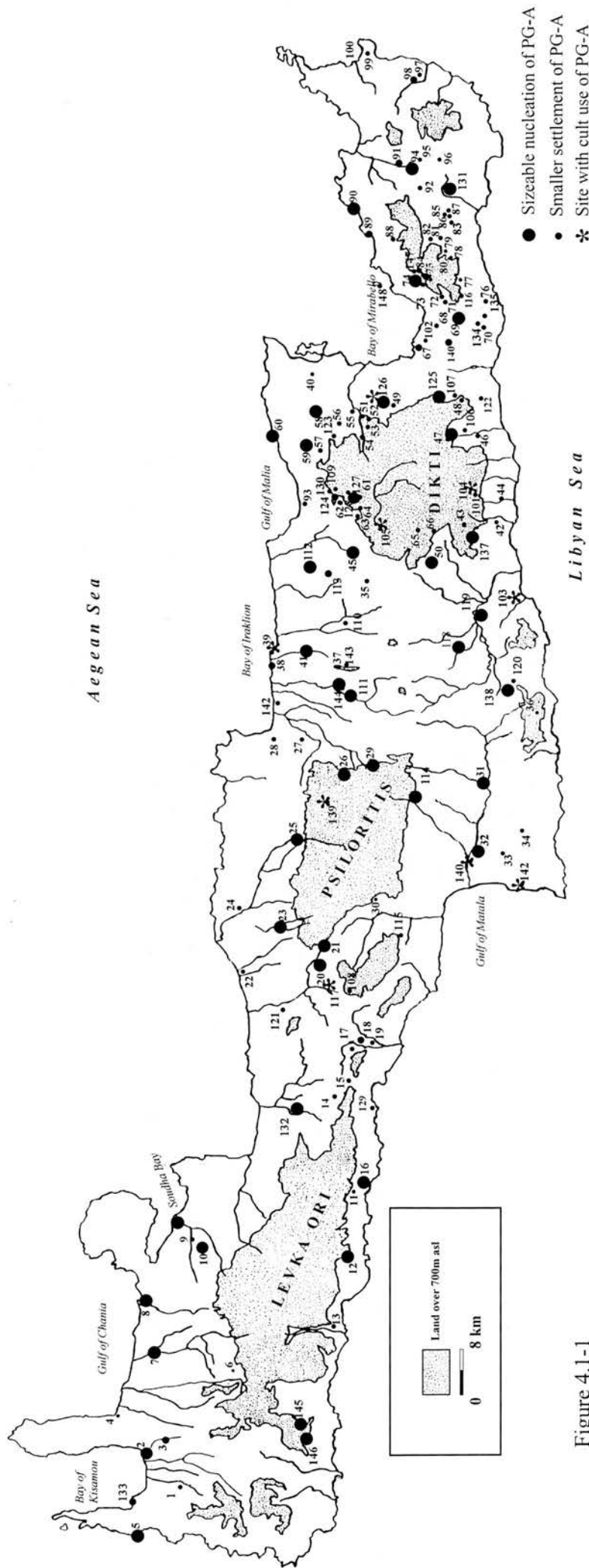


Figure 4.1-1

Sites with PG-A occupation developing from, or in the close vicinity of, LM III-C-SM settlements, or with specialised use for cult in PG-A

(Note: very small rural sites and sites with no clear LM III-SM predecessor in their close region are not shown. Thus the map does not represent all known PG-A settlement in Crete)

Figure 4.2-1  
Model of the spatial relationships of social identities in EIA Crete

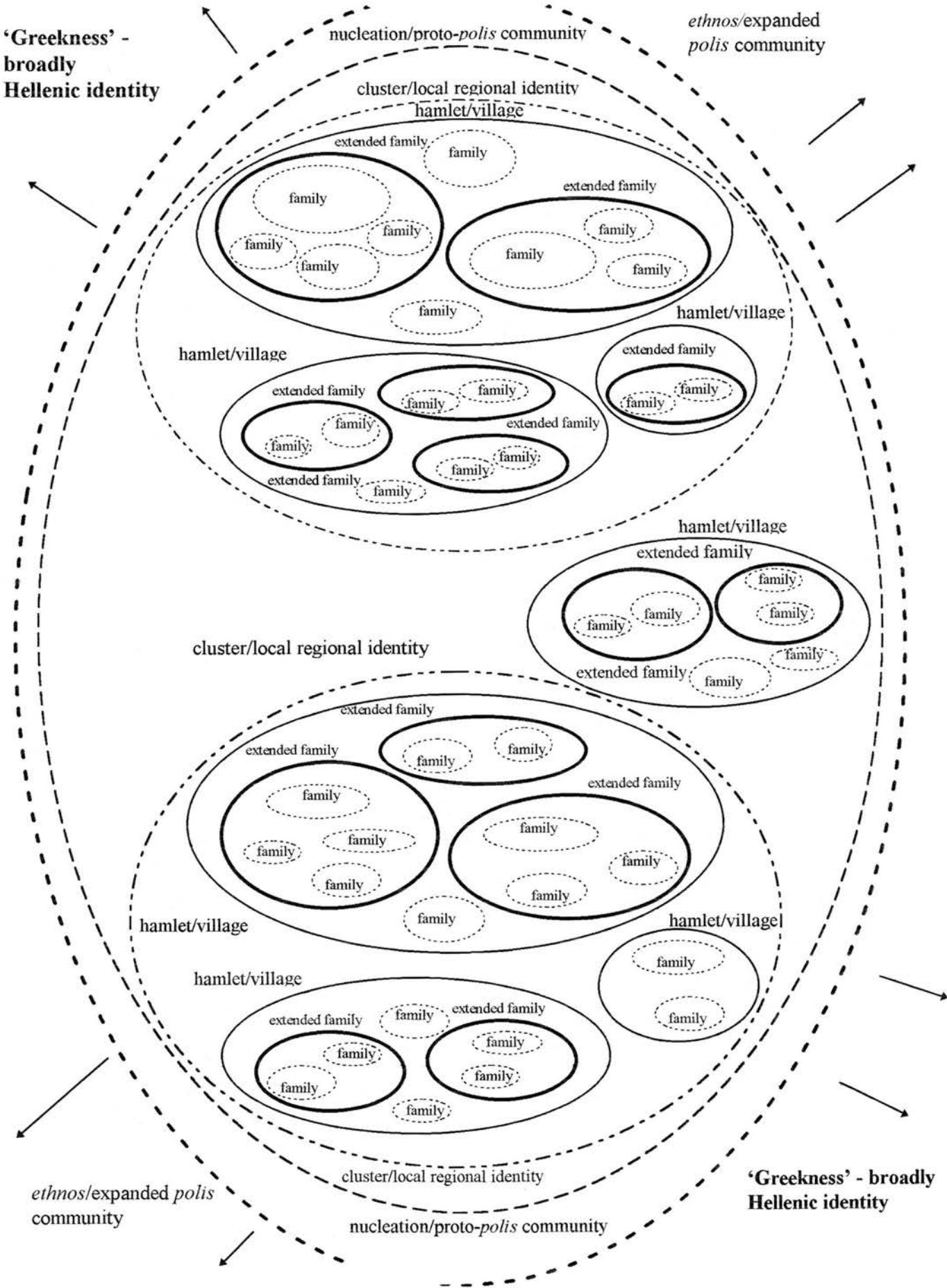






Plate 1



Plate 2



Plate 3



Plate 4



Plate 5



Plate 6



Plate 7



Plate 8





Plate 9

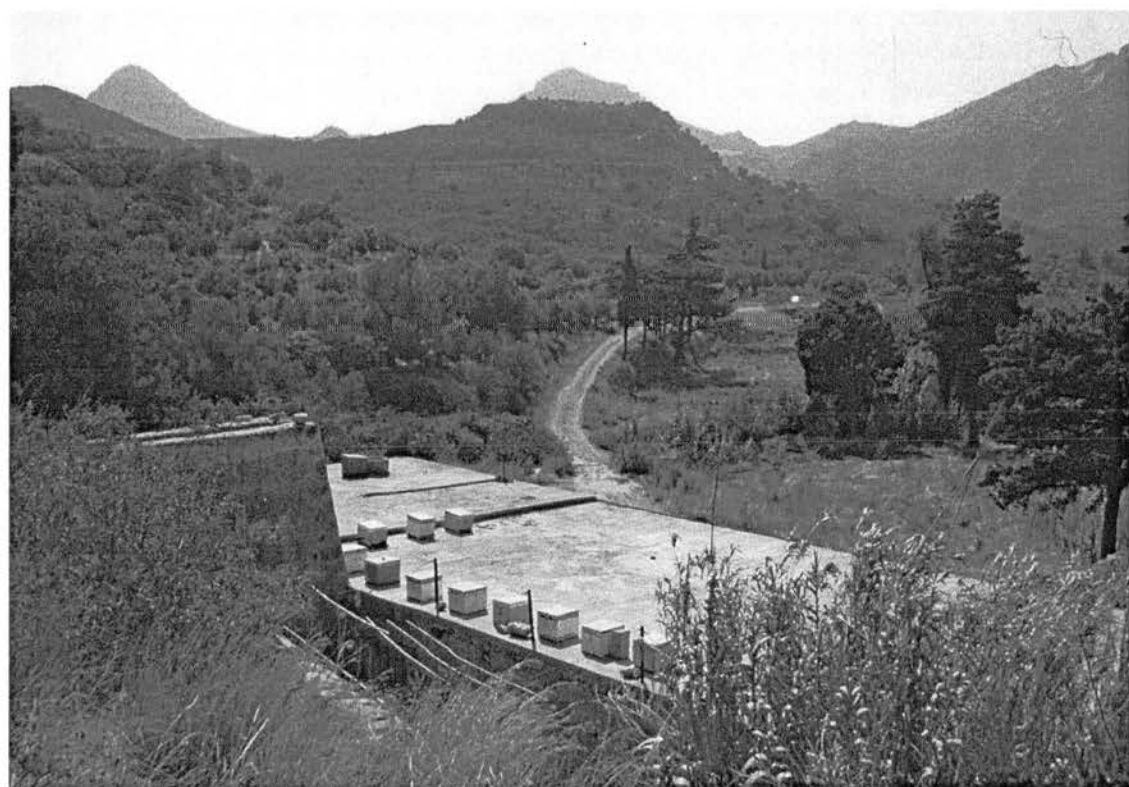


Plate 10



Plate 11

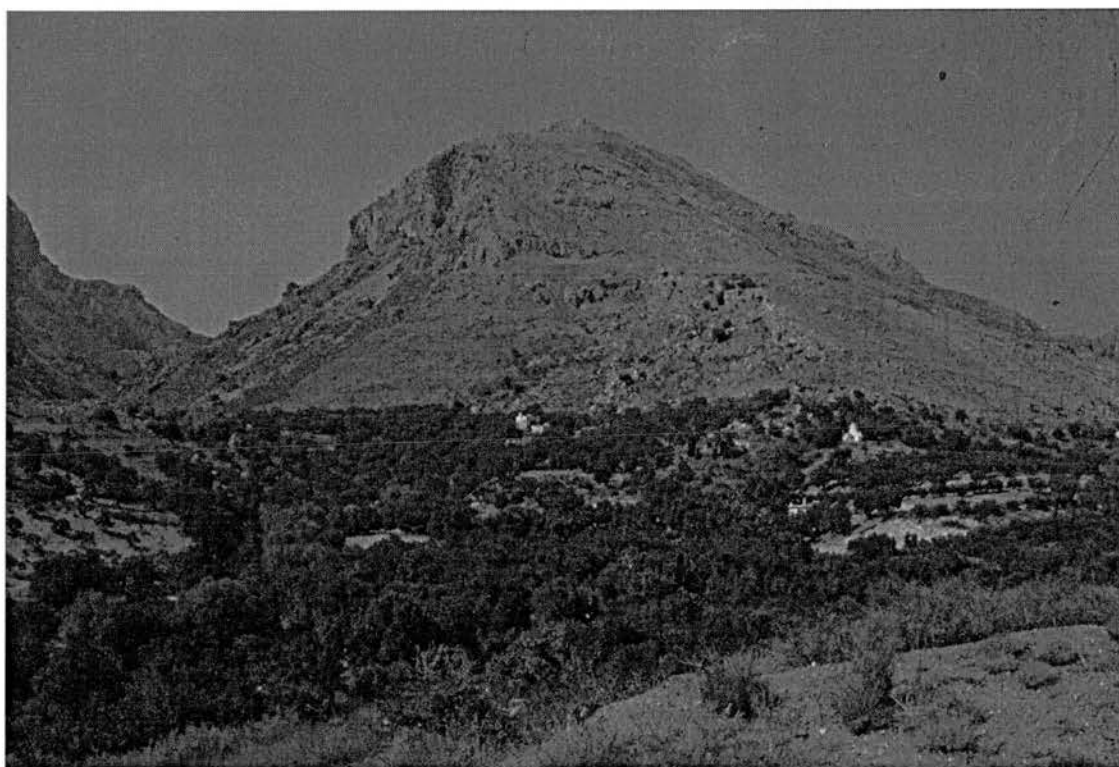


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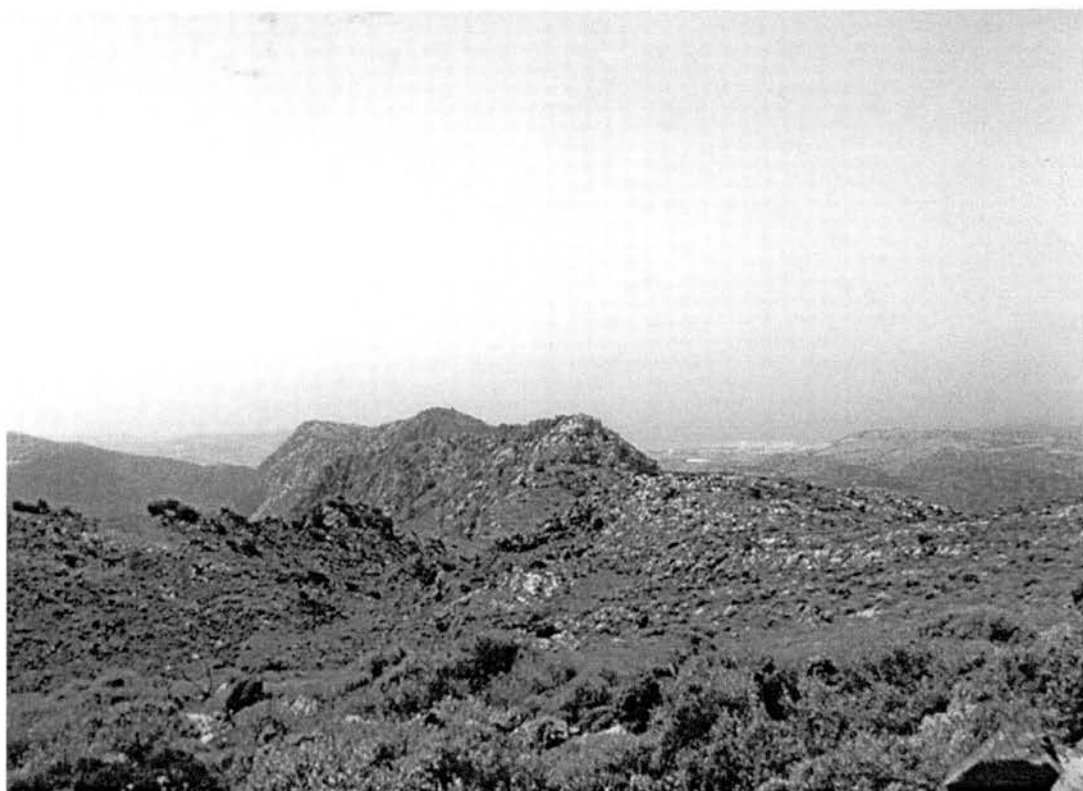


Plate 13



Plate 14



Plate 15



Plate 16



Plate 17



Plate 18



Plate 19

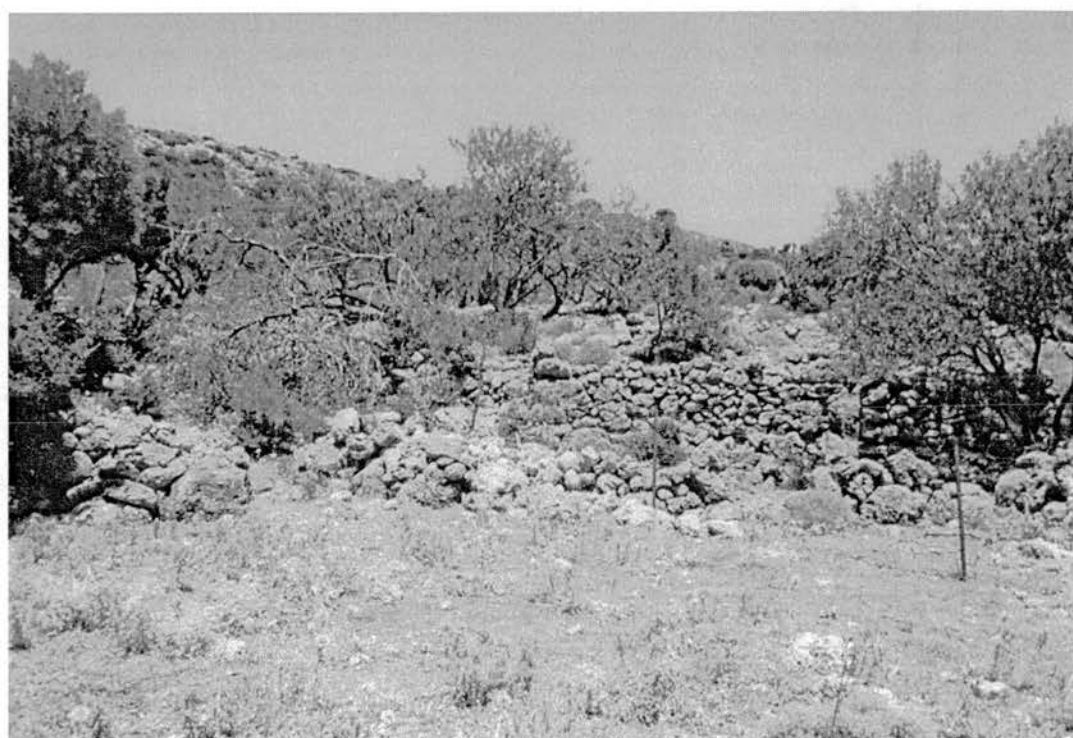


Plate 20



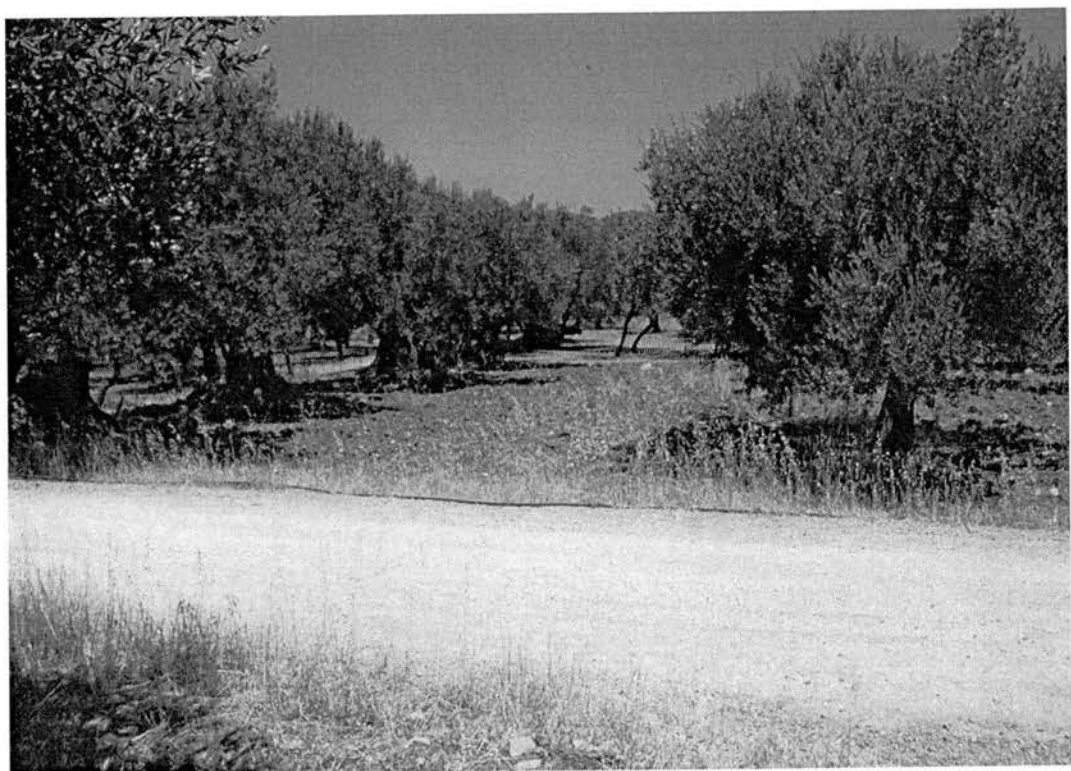


Plate 21



Plate 22



Plate 23

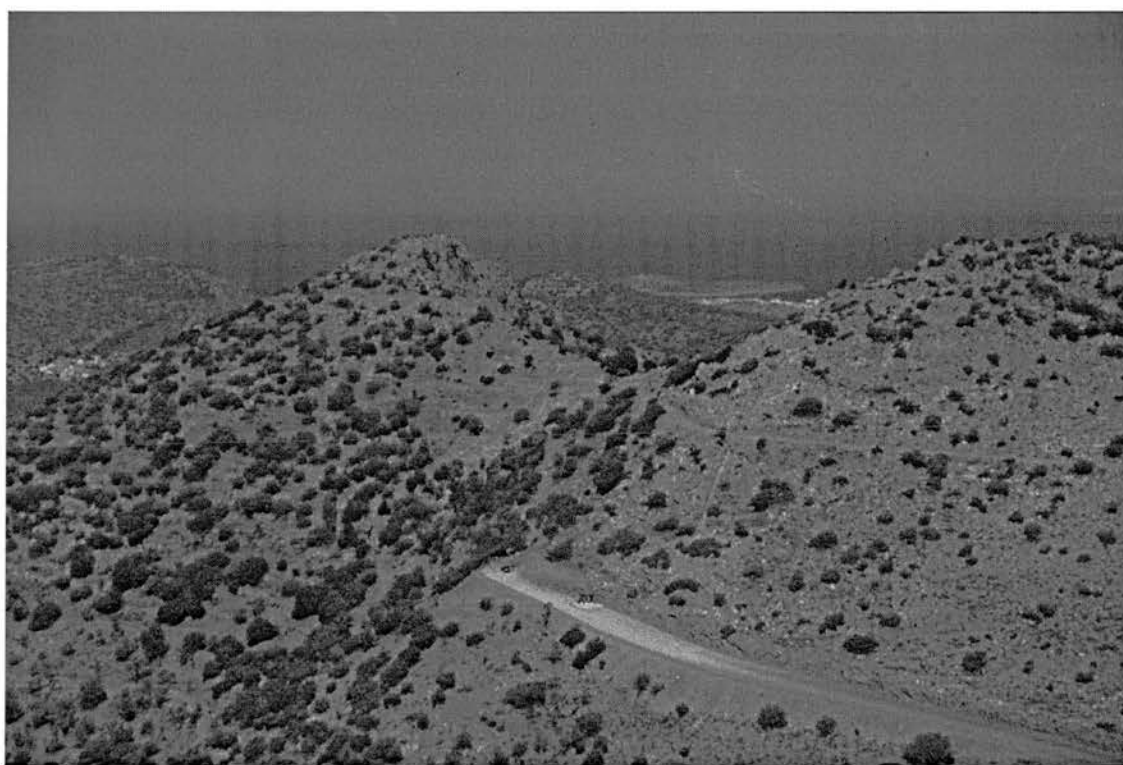


Plate 24





Plate 25



Plate 26

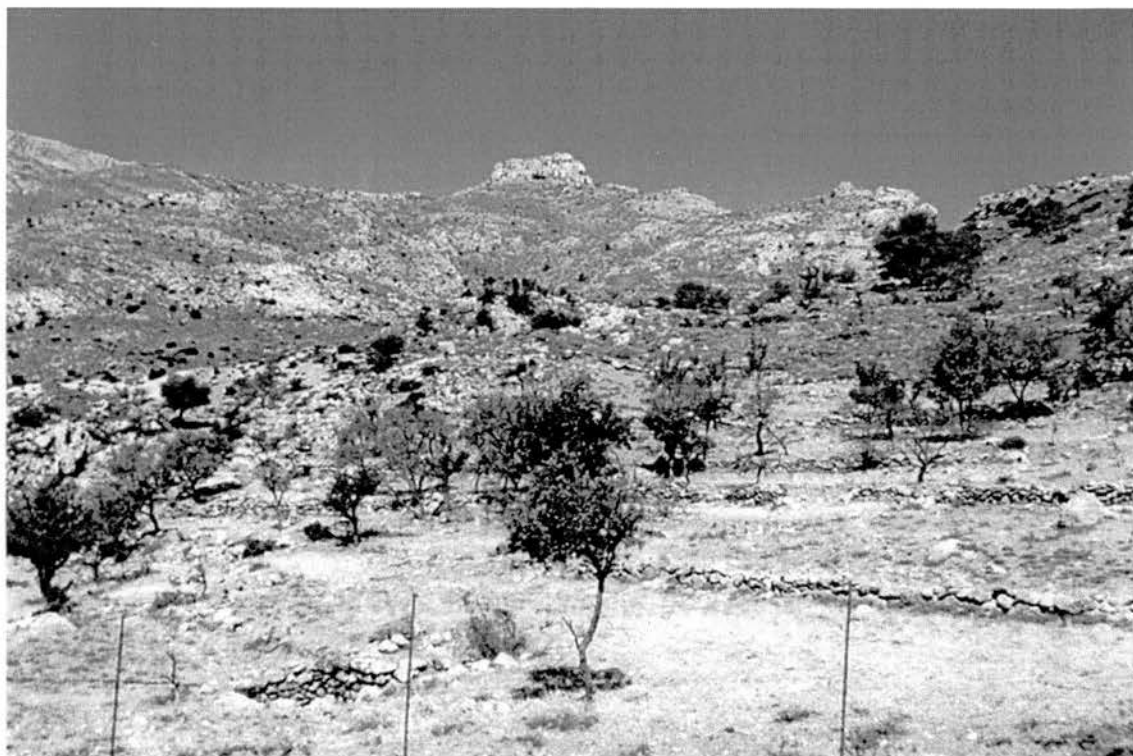


Plate 27



Plate 28

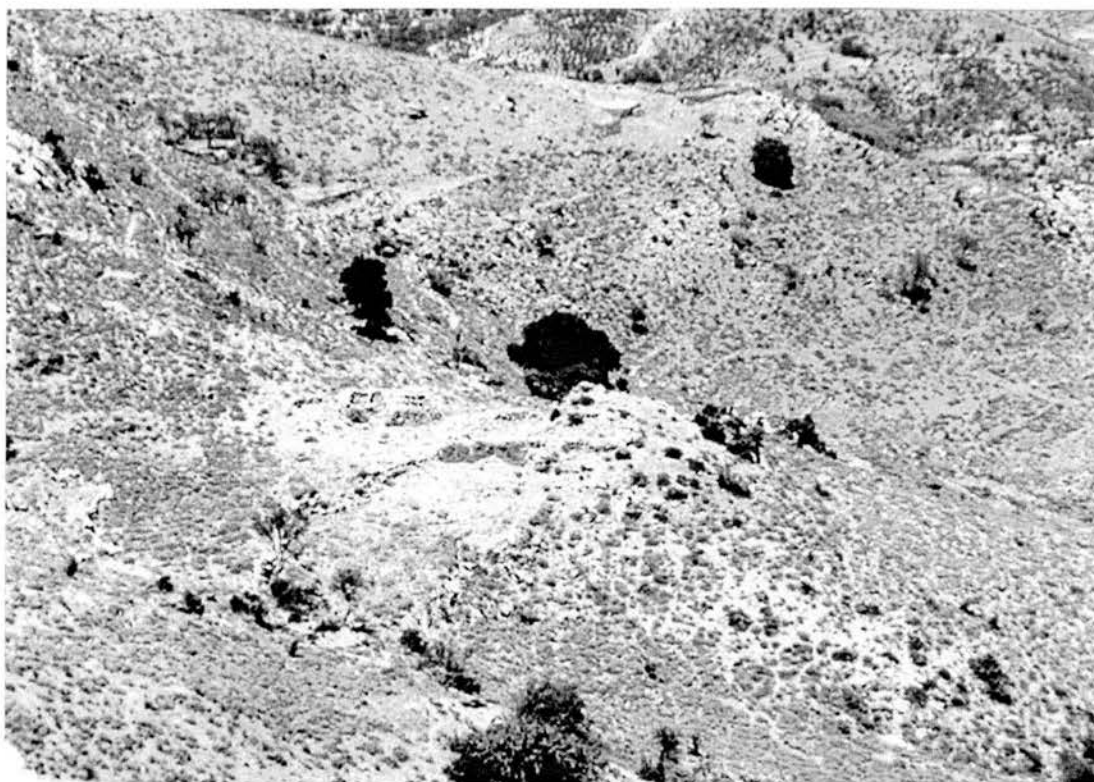


Plate 29



Plate 30



Plate 31



Plate 32



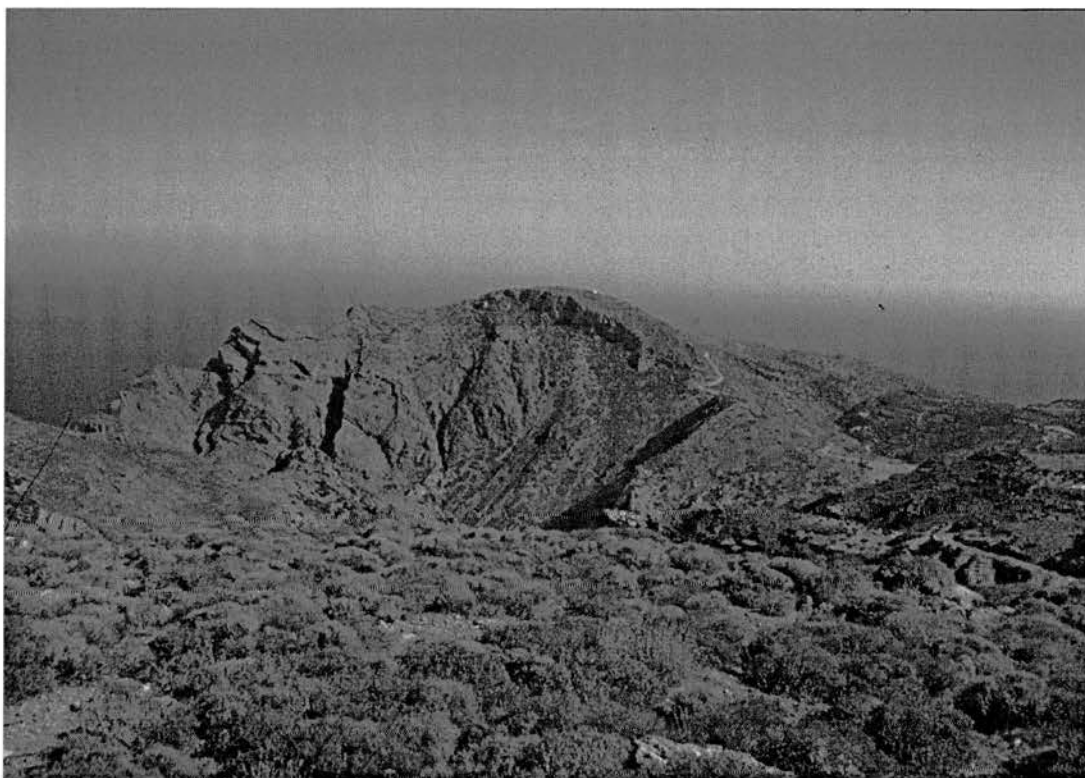


Plate 33



Plate 34



Plate 35



Plate 36



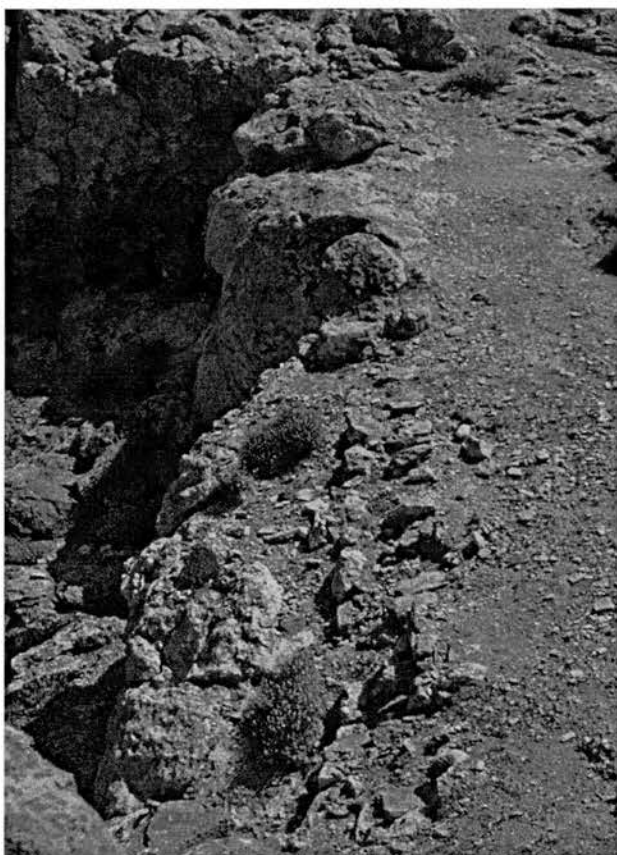


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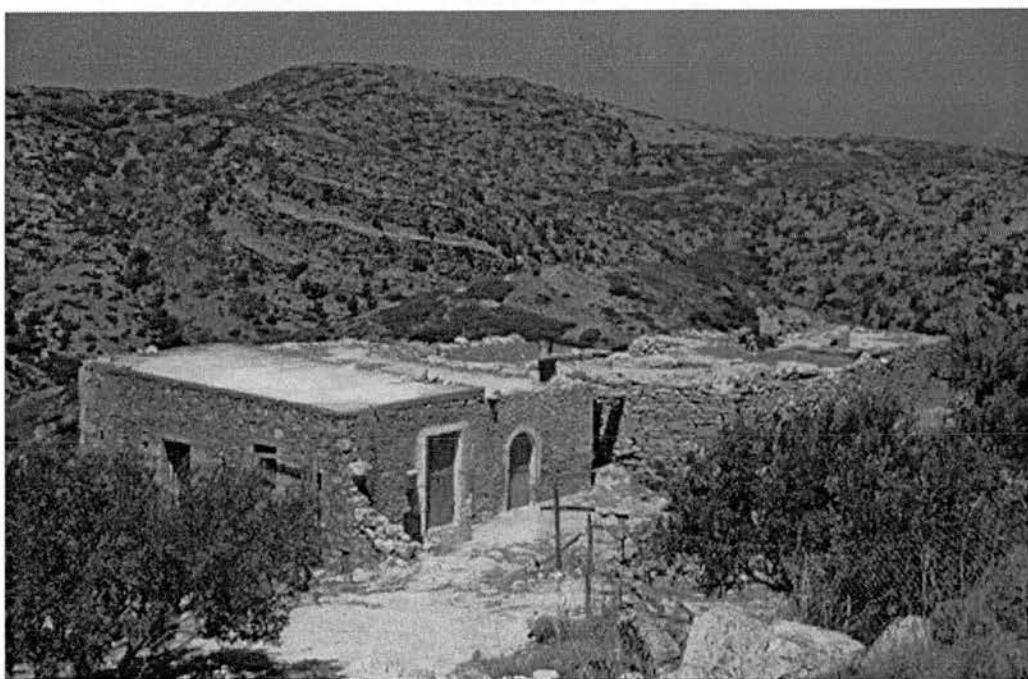


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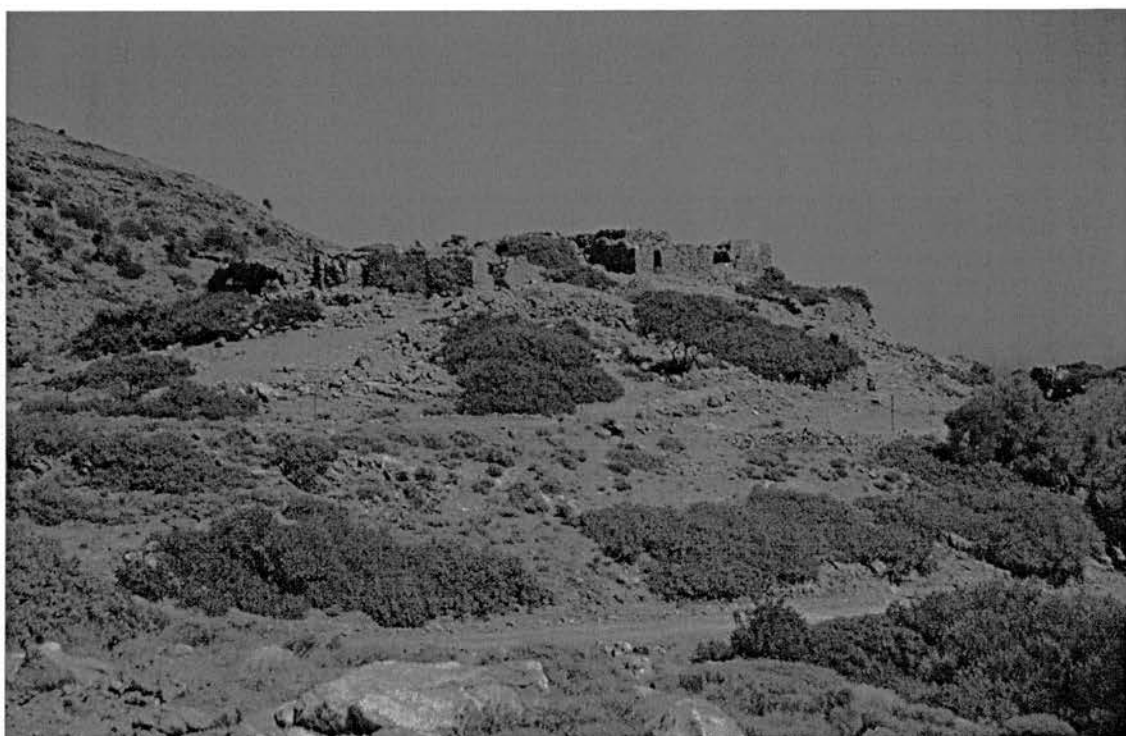


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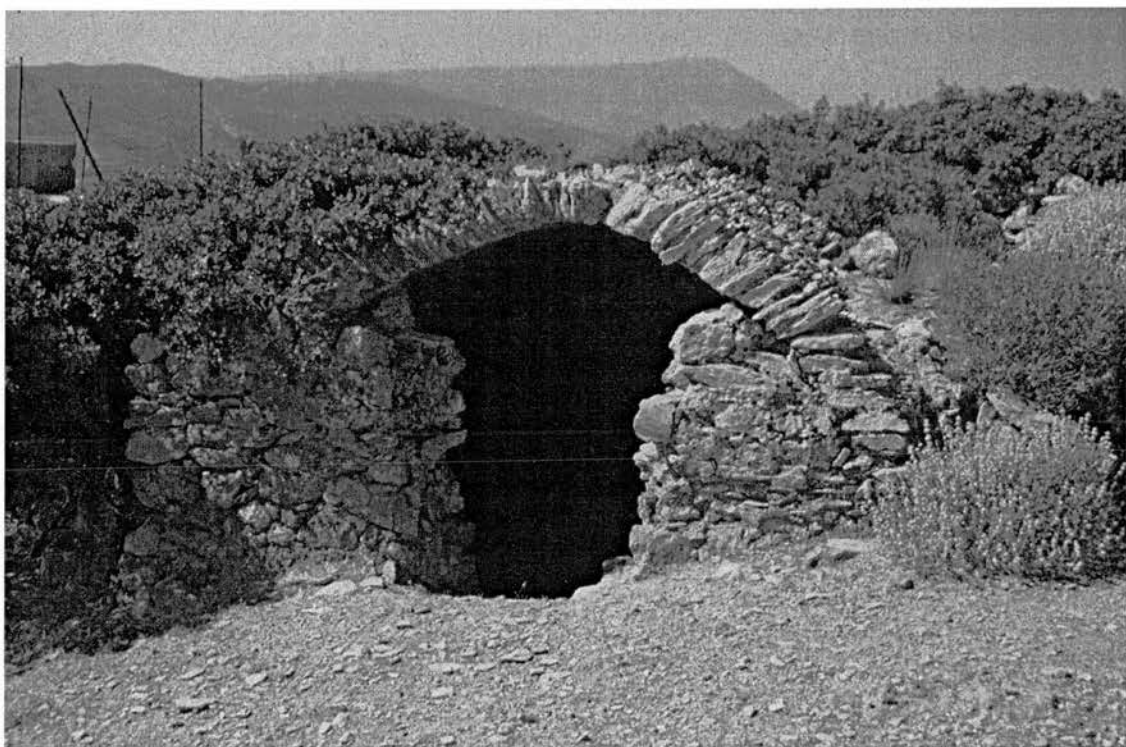


Plate 40



Plate 41



Plate 42



Plate 43



Plate 44



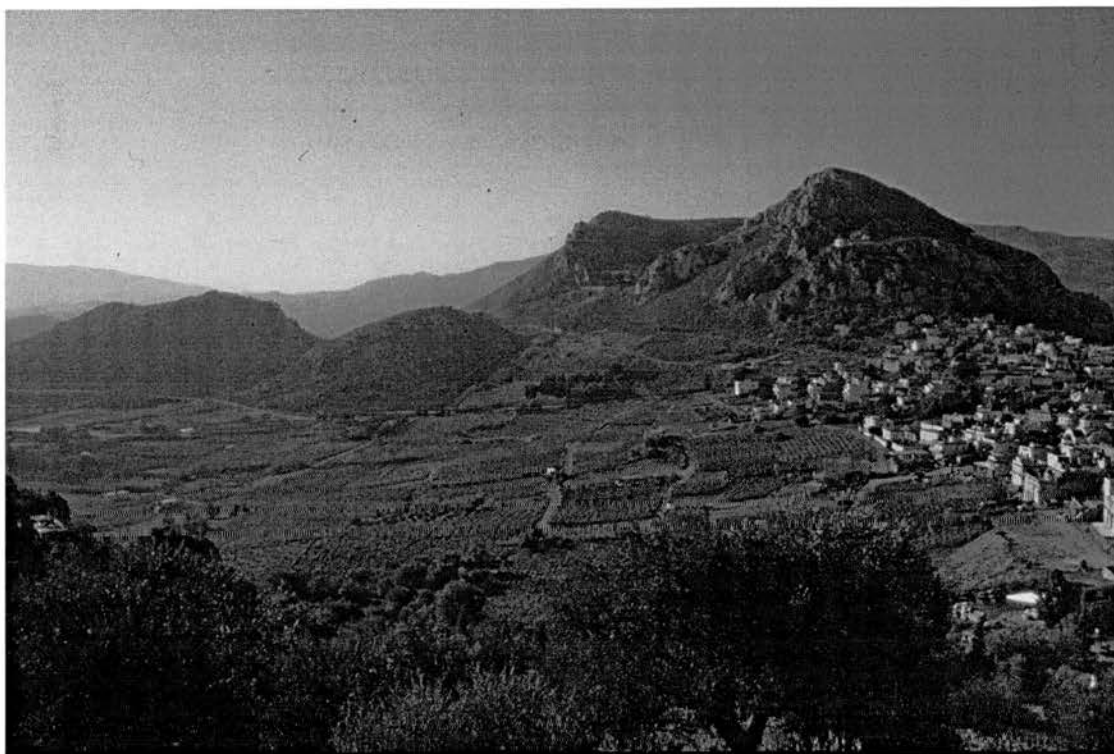


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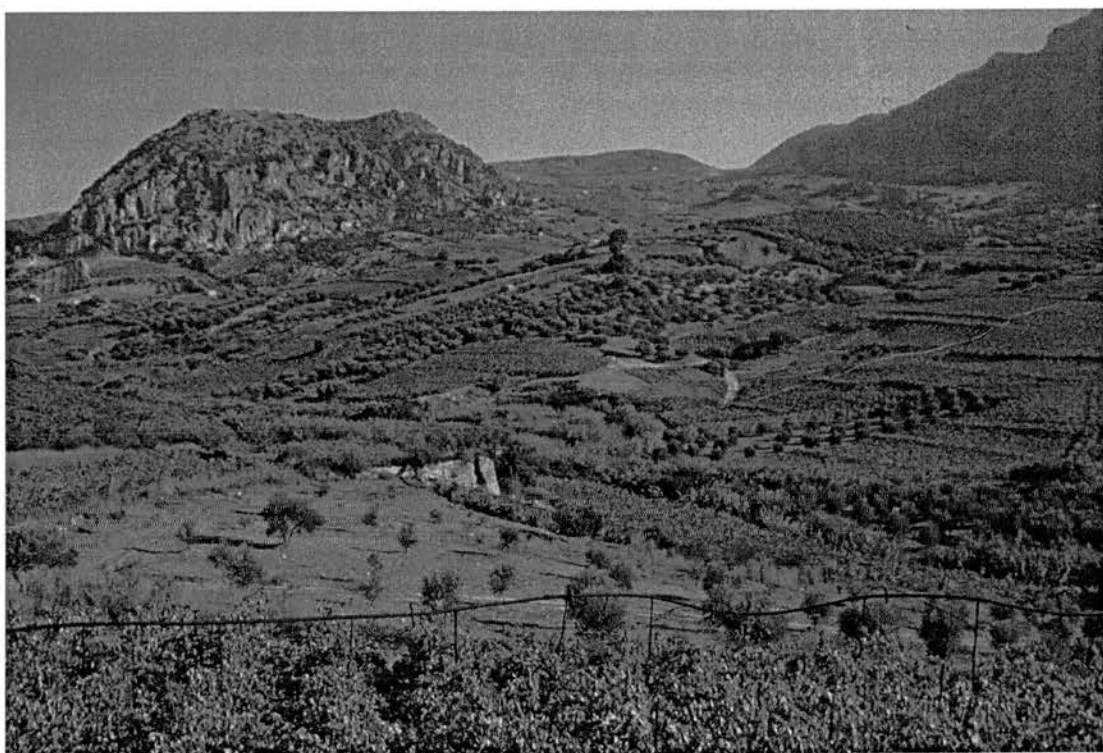


Plate 46

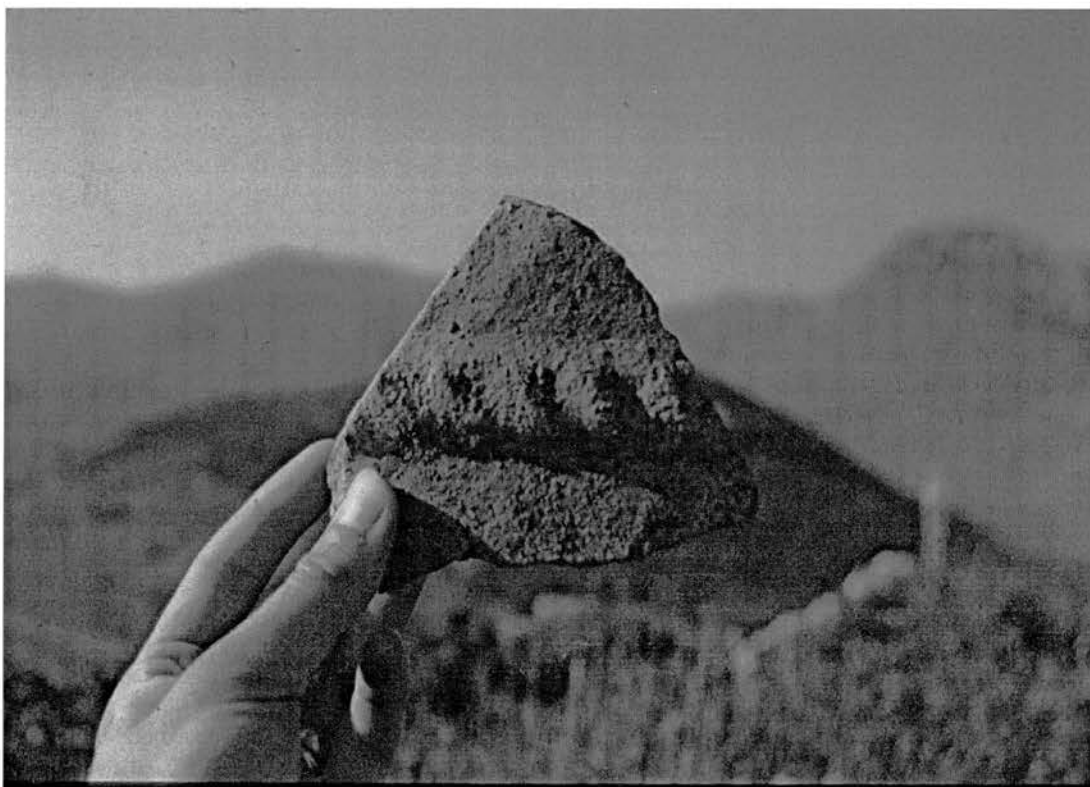


Plate 47



Plate 48





Plate 49



Plate 50

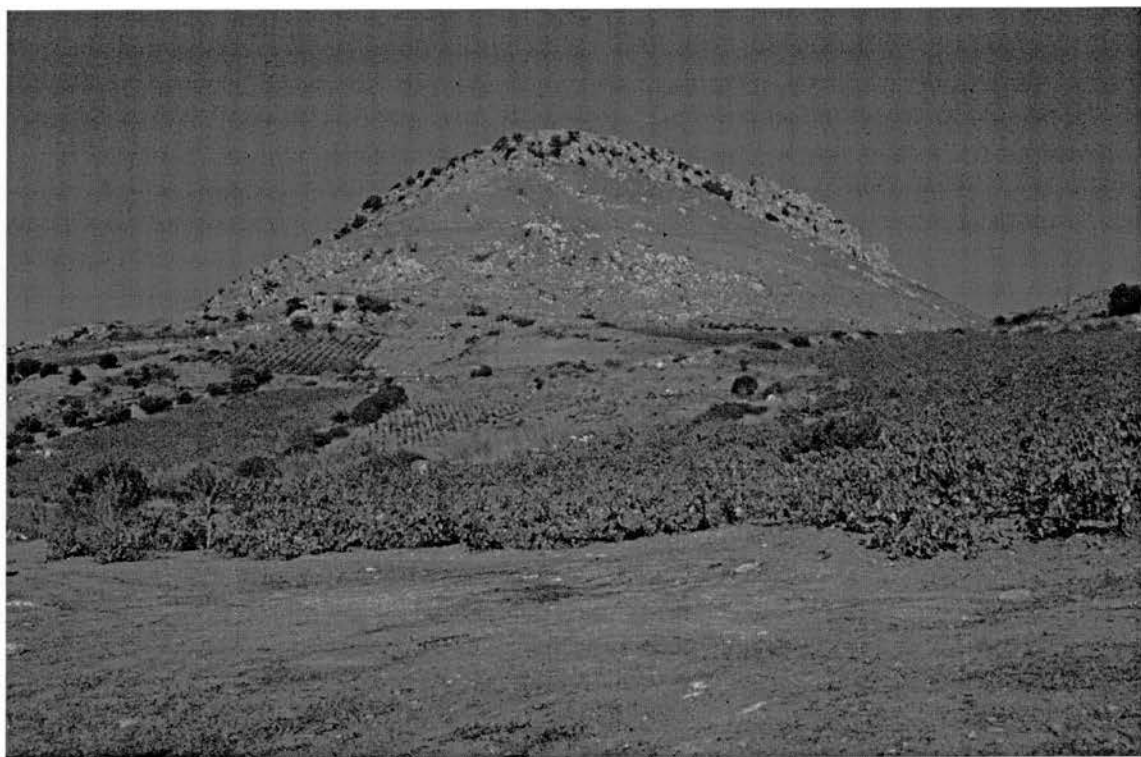


Plate 51

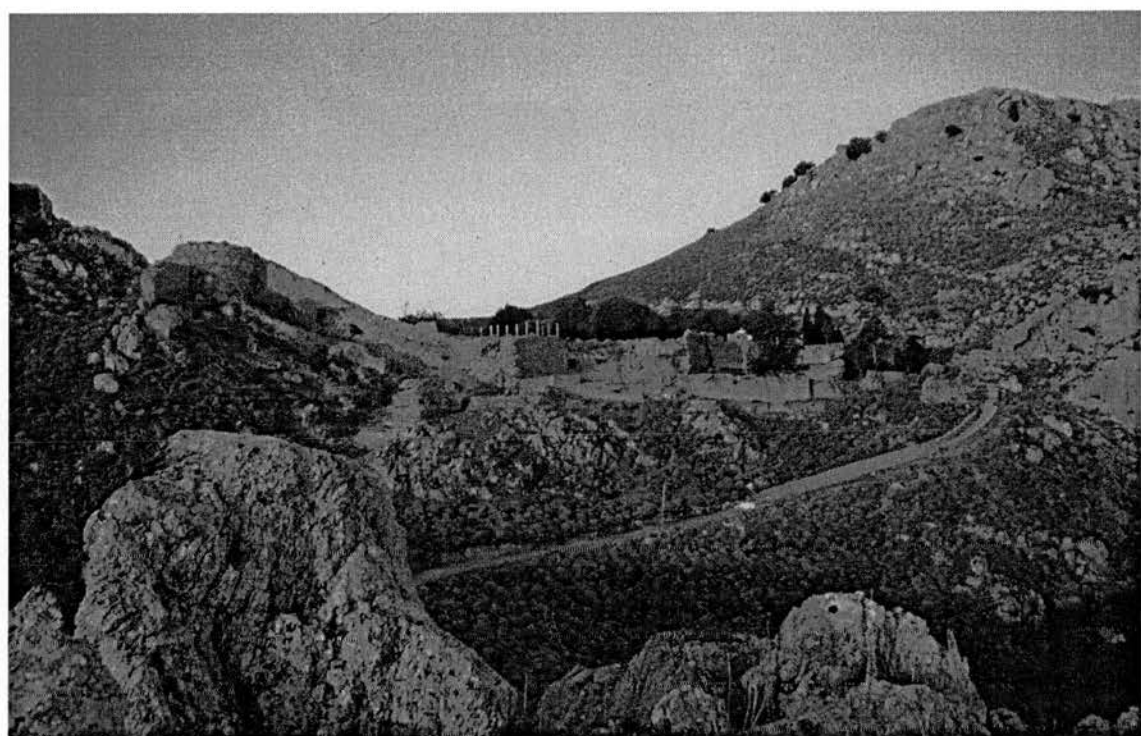


Plate 52



Plate 53



Plate 54

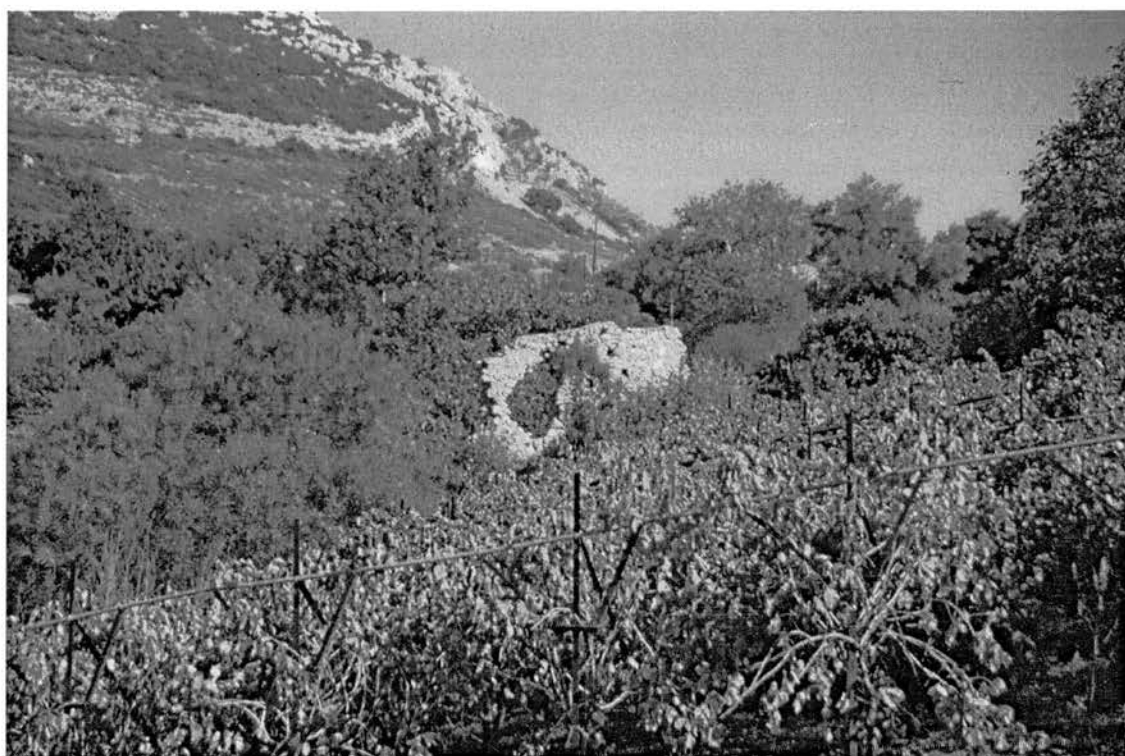


Plate 55

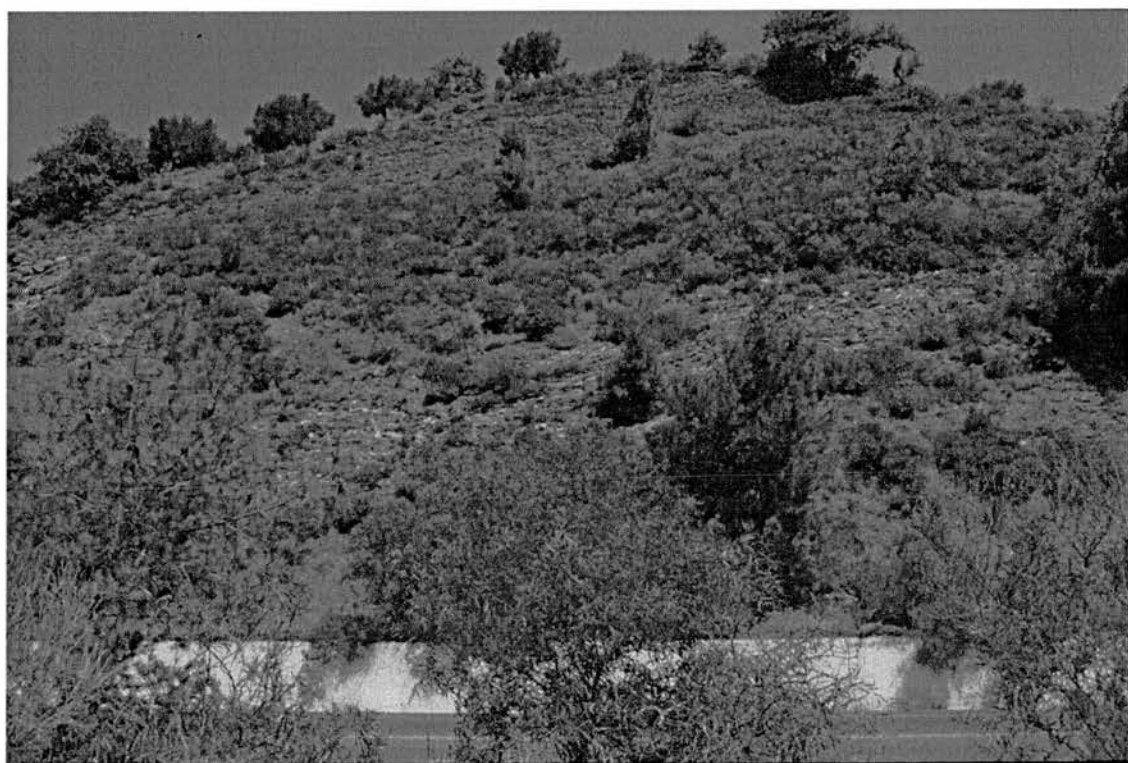


Plate 56





Plate 57

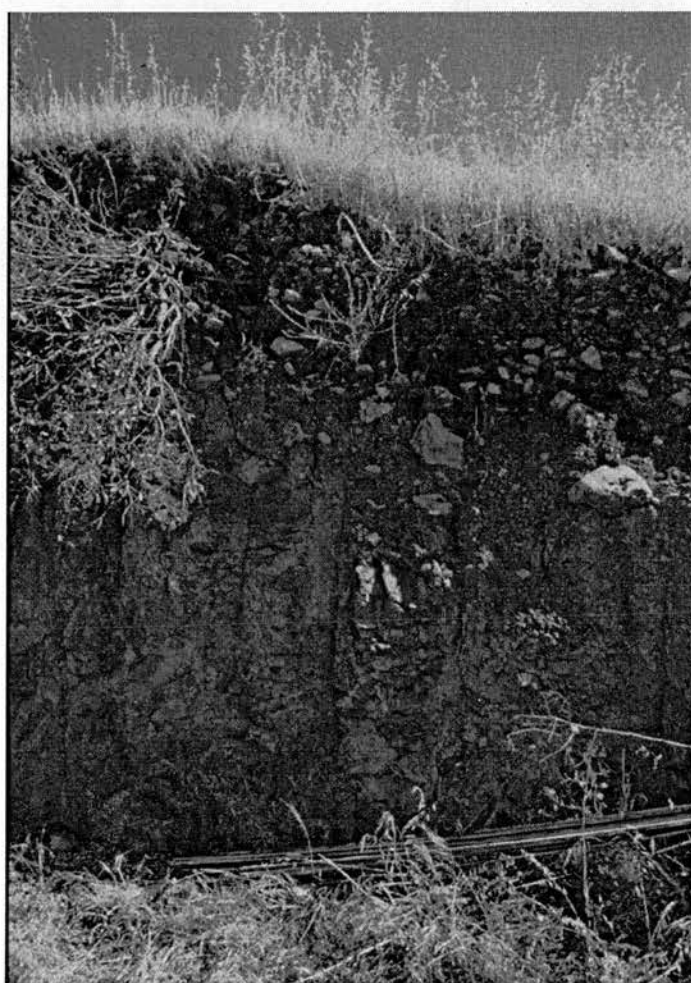


Plate 58